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# Primary productivity on the Labrador shelf during July 1985

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## Canadian Data Report of Fisheries and Aquatic Science No. 760

Fisheries and Oceans Pêches et Océans

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## ABSTRACT

B. Irwin, C. Caverhill, D. Mossman, J. Anning, E. Horne and T. Platt. 1989. Primary productivity on the Labrador Shelf during July 1985. Can. Data Rep. Fish. Aquat. Sci. No. 760: iv + 119 p.

During the period 1 July to 12 July 1985, a series of primary productivity experiments was conducted on board CSS Hudson on the Labrador Shelf. In this report we make available the raw data and also the fitted light saturation parameters.

## RESUME

B. Irwin, C. Caverhill, D. Mossman, J. Anning, E. Horne and T. Platt. 1989. Primary productivity on the Labrador Shelf during July 1985. Can. Data Rep. Fish. Aquat. Sci. No. 760: iv + 119 p.

Pendant la période du 1 juillet au 12 juillet 1985, une série d'expériences de productivité a été effectuée à bord du CSS Hudson, sur le plateau du Labrador. Dans ce rapport nous présentons les données brutes sur ces expériences, ainsi que les paramètres qui furent calculées pour representer les courbes de production en fonction de la lumière.

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## INTRODUCTION

This is the fourteenth in a series of data reports giving results of experiments on photosynthetic production versus light intensity for natural phytoplankton populations in the North Atlantic and adjacent waters north of 50°N. Samples were collected from C.S.S. Hudson between 1 July and 12 July 1985 on the Labrador Shelf NE of Newfoundland. This was a joint cruise with the Ocean Circulation division of the Atlantic Oceanographic Laboratory.

## SAMPLING

All water samples were collected with 30 *l* Niskin bottles. At most stations two depths were sampled - the upper mixed layer and the bottom of the mixed layer. At other stations where no chlorophyll maximum or strong physical gradient was present, water was collected from four depths in the upper 60 m.

## METHODS

Productivity

Primary productivity was measured using the $^{14}C$ method and the oxygen evolution method. The $^{14}C$ method was essentially as described by Strickland and Parsons (1972). 20 µCi of sodium bicarbonate $^{14}C$ was added to each of 42 light and 3 dark bottles for whole samples and 50 µCi added to samples which were to be size fractioned. The whole fractions were collected on 2.5 cm Whatman GF/F glass fibre filters and fractions on Nuclepore and glass fibre filters. Incubation periods were from 2 - 3 hours in temperature controlled incubators illuminated with 250 w tungsten halogen lamps (Irwin et al. 1986).

For the oxygen evolution method the high precision Winkler technique of Williams and Jenkinson (1982) was used. 42 light bottles, 3 dark and 3 time zero bottles

were filled for each experiment. The time zero bottles were fixed immediately after filling. Bottles were incubated for 4 hours.

Chlorophyll

Replicate 100 mls of sample were filtered onto 25 mm Whatman GF/F filters. Chlorophyll was extracted for 24 hours with 85% acetone at 0°C in the dark. The fluorometric technique of Yentsch and Menzel (1963) as modified by Holm Hansen et al. (1965) was used to estimate chlorophyll concentration.

Organic Particulates

Samples for particulate organic carbon and organic nitrogen were filtered onto 25 mm precombusted Whatman GF/F filters. Filters were analyzed by combustion in a Perkin Elmer model 210 CHN analyzer.

Nutrients

Samples for nitrate, silicate and inorganic phosphate were collected from most sampled depths. Vials were stored frozen at -20°C and later analyzed in the laboratory using a Technicon II Autoanalyzer. Nitrate was measured using industrial method 158-71W, silicate with method 186-72W and phosphate with method 155-71W.

Incubation and Incident Light

Photosynthetically Active Radiation (P.A.R.) was measured at each bottle position in the incubators with a Biospherical Instruments $4\pi$ quantum meter (Model Q.S.L. 100).

Total incident light was measured with an Eppley 40 Junction black and white pyranometer (Model 8-48) and P.A.R. with a $2\pi$ quantum sensor (Licor Li 19OS). Output from both instruments was integrated hourly and logged on a Licor Li 550 printing integrator.

Estimation of Photosynthetic Parameters

Measurement of specific production $P^B$ and irradiance I were used to estimate parameters in the equation of Platt et al. (1980),

$$P^B = P_S (1 - e^{-\alpha I/Ps}) e^{-\beta I/Ps}$$

$P_s$ (mg C (mg Chl)$^{-1}$ h$^{-1}$) is the light saturated rate of photosynthesis in the absence of photoinhibition, $\alpha$ (mg C (mg Chl)$^{-1}$ h$^{-1}$ w$^{-1}$ m$^{-2}$) is the initial slope of the PI curve and $\beta$ (same units as $\alpha$) is a parameter that characterises photoinhibition. Complete details of the fitting routine are given in Irwin et al. (1982) and a discussion of the mathematical basis for this technique is given in Irwin et al. (1980).

## ACKNOWLEDGEMENTS

We wish to thank Alastair Macdonald for his assistance in the analysis of samples and the preparation of data for this report.

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Yentsch, C.S. and D.W. Menzel. 1963. A method for the determination of phytoplankton chlorophyll and phaeophytin by fluorescence. Deep-Sea Res. 10: 221-231.

# LOCATION OF SAMPLING STATIONS

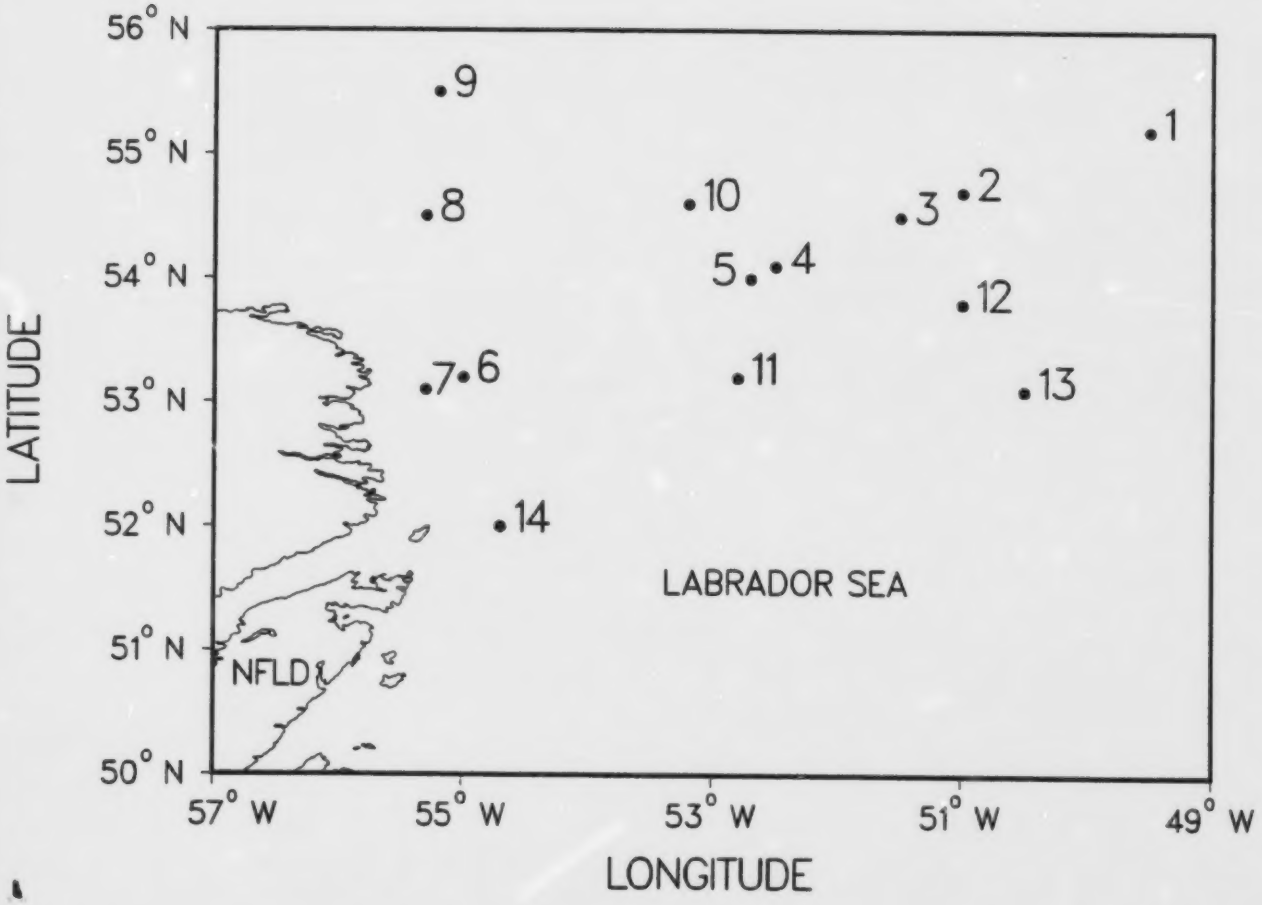



Fig. 1 Location of sampling stations.

# LIGHT SATURATION DATA AND RELATED BIOMASS AND NUTRIENT DATA

# UNITS

$P = mg\ C\ (mg\ chl)^{-1}\ m^{-3}\ h^{-1}$

$I = W\ m^{-2}$

$P_s = mg\ C\ (mg\ chl)^{-1}\ h^{-1}$

$\alpha = mg\ C\ (mg\ chl)^{-1}\ h^{-1}\ w^{-1}\ m^{-2}$

$\beta = mg\ C\ (mg\ chl)^{-1}\ h^{-1}\ w^{-1}\ m^{-2}$

Organic particulates are in mg $m^{-3}$. Inorganic nutrients are in mg at $m^{-3}$. The 90% confidence interval for $P_s$, $\alpha$, $\beta$ are shown in the closed brackets below the estimates for each parameter.

LABRADOR SEA 1985

STATION NO. 1

LAT 55°14.6' N LONG 49°31.9' W DATE 02/07/85 DEPTH 45 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 179 | .54 | 167 | .54 | 151 | .65 | 136 | .62 |
| 116 | .70 | 96 | .69 | 88 | .87 | 64 | .85 |
| 56 | .83 | 48 | .72 | 38 | .83 | 21 | .65 |
| 18 | .40 | 16 | .36 | 15 | .28 | 7 | .24 |
| 6 | .16 | 5 | .10 | 5 | .11 | 3 | .13 |
| 3 | .07 | 2 | .03 | 2 | .06 | 2 | .04 |
| 1 | .03 | 1 | .01 | 1 | .02 | .9 | .01 |
| .9 | .02 | .5 | .01 | .4 | .00 | | |

PARAMETER VALUES

PS : 2.16 ( .97, 3.35 )

ALPHA : .033 ( .031, .036 )

BETA : .0167 ( .0016, .0318 )

FRACTION : WHOLE

SAMPLE TEMP 3.0°C INCUBATION TEMP 3.5°C

CHLOROPHYLL : 2.30 CARBON : 268 NITROGEN : 48

NITRATE : 14.82 SILICATE : 4.37 PHOSPHATE : 1.62

LABRADOR SEA 1985

STATION NO. 1

LAT 55°14.6' N LONG 49°31.9' W DATE 02/07/85 DEPTH 45 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 698 | .02 | 538 | .06 | 458 | .07 | 419 | .11 |
| 379 | .19 | 319 | .28 | 239 | .25 | 219 | .31 |
| 159 | .50 | 140 | .61 | 140 | .56 | 120 | .70 |
| 62 | .77 | 56 | .74 | 52 | .66 | 50 | .68 |
| 46 | .72 | 22 | .54 | 22 | .66 | 20 | .52 |
| 18 | .44 | 18 | .38 | 10 | .42 | 8 | .15 |
| 8 | .32 | 6 | .20 | 6 | .19 | 3 | .10 |
| 3 | .14 | 3 | .06 | 3 | .07 | 3 | .06 |
| 2 | .06 | 1 | .04 | 1 | .05 | .4 | .02 |
| .3 | .01 | .3 | .01 | | | | |

PARAMETER VALUES

PS : 1.26 ( 1.13, 1.39 )

ALPHA : .037 ( .035, .039 )

BETA : .0071 ( .0057, .0085 )

FRACTION : >1 MICRON

SAMPLE TEMP 3.0°C INCUBATION TEMP 3.5°C

CHLOROPHYLL : 2.37 CARBON : 268 NITROGEN : 48

NITRATE : 14.82 SILICATE : 4.37 PHOSPHATE : 1.62

LABRADOR SEA 1985

STATION NO. 1

LAT 55°14.6' N LONG 49°31.9' W DATE 02/07/85 DEPTH 45 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 698 | .14 | 538 | .12 | 458 | .06 | 419 | .05 |
| 319 | .07 | 239 | .07 | 219 | .17 | 140 | .74 |
| 120 | .72 | 62 | .84 | 56 | .79 | 52 | .77 |
| 46 | .62 | 44 | .62 | 28 | .83 | 22 | .63 |
| 22 | .66 | 20 | .74 | 18 | .64 | 18 | .70 |
| 16 | .79 | 10 | .48 | 8 | .34 | 8 | .44 |
| 6 | .47 | 6 | .34 | 3 | .16 | 3 | .17 |
| 3 | .17 | 3 | .19 | 3 | .18 | 3 | .08 |
| 2 | .26 | 1 | .20 | 1 | .22 | .4 | .22 |
| .3 | .14 | | | | | | |

PARAMETER VALUES

PS : 1.08 ( .95, 1.21 )

ALPHA : .072 ( .064, .081 )

BETA : .0064 ( .0045, .0083 )

FRACTION : <1 MICRON

SAMPLE TEMP 3.0°C INCUBATION TEMP 3.5°C

CHLOROPHYLL : .13 CARBON : 268 NITROGEN : 48

NITRATE : 14.82 SILICATE : 4.37 PHOSPHATE : 1.62

LABRADOR SEA 1985

STATION NO. 2

LAT 54°41.5' N LONG 50°59.2' W DATE 03/07/85 DEPTH 25 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 179 | 1.95 | 144 | 2.11 | 120 | 1.76 | 100 | 1.41 |
| 80 | 1.36 | 52 | 1.40 | 38 | 1.54 | 36 | 1.09 |
| 32 | .98 | 30 | .75 | 18 | .68 | 14 | .61 |
| 12 | .46 | 12 | .37 | 10 | .30 | 6 | .20 |
| 4 | .12 | 4 | .13 | 4 | .09 | 3 | .07 |
| 2 | .05 | 2 | .03 | 2 | .04 | 1 | .02 |
| 1 | .03 | .7 | .01 | .6 | .02 | .5 | .04 |
| .4 | .03 | .4 | .00 | .2 | .02 | .2 | .02 |
| .1 | .02 | .1 | .02 | .0 | .01 | | |

PARAMETER VALUES

PS : 1.94 ( 1.30, 2.57 )

ALPHA : .043 ( .038, .047 )

BETA : .0000 ( -.0037, .0037 )

FRACTION : WHOLE

SAMPLE TEMP 2.5°C INCUBATION TEMP 4.0°C

CHLOROPHYLL : .37 CARBON : 291 NITROGEN : 49

NITRATE : .24 SILICATE : 3.32 PHOSPHATE : .51

LABRADOR SEA 1985

STATION NO. 2

LAT 54°41.5' N LONG 50°59.2' W DATE 03/07/85 DEPTH 25 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 698 | .66 | 538 | .87 | 458 | .74 | 379 | 1.03 |
| 319 | 1.09 | 219 | 1.05 | 159 | 1.16 | 140 | 1.12 |
| 140 | 1.05 | 120 | .82 | 56 | .91 | 52 | .85 |
| 50 | .79 | 46 | .60 | 44 | .49 | 22 | .48 |
| 22 | .44 | 20 | .33 | 18 | .24 | 10 | .19 |
| 8 | .09 | 3 | .03 | 3 | .02 | .3 | .00 |

PARAMETER VALUES

PS : 1.42 ( 1.26, 1.58 )

ALPHA : .021 ( .019, .023 )

BETA : .0015 ( .0009, .0020 )

FRACTION : >1 MICRON

SAMPLE TEMP 2.5°C INCUBATION TEMP 4.0°C

CHLOROPHYLL : .18 CARBON : 291 NITROGEN : 49

NITRATE : .24 SILICATE : 3.32 PHOSPHATE : .51

LABRADOR SEA 1985

STATION NO. 2

LAT 54°41.5' N LONG 50°59.2' W DATE 03/07/85 DEPTH 25 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 538 | .35 | 458 | .50 | 419 | .67 | 379 | .66 |
| 219 | .75 | 159 | .67 | 140 | .66 | 140 | .75 |
| 120 | .75 | 56 | .74 | 52 | .69 | 50 | .62 |
| 46 | .60 | 44 | .51 | 22 | .52 | 22 | .54 |
| 20 | .47 | 18 | .37 | 10 | .21 | 8 | .09 |
| 8 | .15 | 6 | .10 | 6 | .17 | 3 | .08 |
| 3 | .09 | 3 | .03 | 3 | .01 | 3 | .05 |
| 2 | .04 | 1 | .05 | 1 | .02 | .4 | .03 |
| .3 | .02 | | | | | | |

PARAMETER VALUES

PS : .86 ( .80, .92 )

ALPHA : .028 ( .026, .030 )

BETA : .0009 ( .0006, .0012 )

FRACTION : <1 MICRON

SAMPLE TEMP 2.5°C INCUBATION TEMP 4.0°C

CHLOROPHYLL : .26

CARBON : 291

NITROGEN : 49

NITRATE : .24

SILICATE : 3.32

PHOSPHATE : .51

LABRADOR SEA 1985

STATION NO. 2

LAT 54°41.5' N LONG 50°59.2' W DATE 03/07/85 DEPTH 1 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 777 | 2.14 | 678 | 1.90 | 598 | 1.87 | 498 | 1.88 |
| 379 | 1.83 | 223 | 1.90 | 191 | 1.88 | 175 | 1.70 |
| 155 | 1.88 | 84 | 1.90 | 68 | 1.92 | 48 | 1.35 |
| 42 | 1.22 | 32 | 1.17 | 26 | 1.03 | 21 | .71 |
| 18 | .63 | 15 | .67 | 14 | .74 | 10 | .47 |
| 8 | .40 | 6 | .27 | 5 | .26 | 5 | .12 |
| 4 | .04 | 3 | .13 | 3 | .06 | 2 | .09 |
| 2 | .09 | 1 | .02 | .5 | .00 | | |

PARAMETER VALUES

PS : 1.92 ( 1.84, 1.99 )

ALPHA : .054 ( .051, .057 )

BETA : .0000 ( -.0002, .0002 )

FRACTION : WHOLE

SAMPLE TEMP 3.5°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : .28 CARBON : 116 NITROGEN : 34

NITRATE : .09 SILICATE : 1.93 PHOSPHATE : .26

LABRADOR SEA 1985

STATION NO. 3

LAT 54°31.2' N LONG 51°27.0' W DATE 03/07/85 DEPTH 35 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 144 | 1.16 | 120 | 1.33 | 100 | 1.06 | 80 | 1.13 |
| 52 | 1.13 | 38 | 1.09 | 36 | 1.02 | 32 | .83 |
| 18 | .71 | 14 | .59 | 12 | .43 | 12 | .39 |
| 10 | .29 | 6 | .17 | 4 | .10 | 4 | .08 |
| 4 | .05 | 3 | .05 | 2 | .06 | 2 | .04 |
| 2 | .03 | 1 | .03 | 1 | .03 | .8 | .03 |
| .7 | .02 | .6 | .03 | .5 | .01 | .4 | .01 |
| .4 | .01 | .3 | .01 | .2 | .00 | .1 | .05 |
| .1 | .05 | .0 | .03 | | | | |

PARAMETER VALUES

PS : 1.68 ( 1.19, 2.17 )

ALPHA : .044 ( .041, .048 )

BETA : .0041 ( -.0006, .0087 )

FRACTION : WHOLE

SAMPLE TEMP 2.5°C INCUBATION TEMP 4.0°C

CHLOROPHYLL : 3.40

CARBON : 283

NITROGEN : 53

NITRATE : .33

SILICATE : 3.32

PHOSPHATE : .54

LABRADOR SEA 1985

STATION NO. 3

LAT 54°31.2' N LONG 51°27.0' W DATE 03/07/85 DEPTH 35 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 698 | .14 | 538 | .16 | 458 | .25 | 419 | .33 |
| 379 | .41 | 319 | .57 | 159 | .74 | 140 | .75 |
| 140 | .76 | 120 | .64 | 56 | .70 | 52 | .64 |
| 50 | .59 | 46 | .61 | 44 | .46 | 22 | .49 |
| 22 | .49 | 20 | .38 | 18 | .34 | 18 | .26 |
| 10 | .21 | 8 | .08 | 8 | .17 | 6 | .13 |
| 6 | .11 | 3 | .03 | 3 | .03 | 3 | .06 |
| 3 | .03 | 3 | .03 | 2 | .02 | 1 | .04 |
| 1 | .00 | .4 | .00 | .3 | .01 | .3 | .00 |

PARAMETER VALUES

PS : 1.24 ( 1.11, 1.37 )

ALPHA : .022 ( .021, .024 )

BETA : .0039 ( .0030, .0047 )

FRACTION : >1 MICRON

SAMPLE TEMP 2.5°C INCUBATION TEMP 4.0°C

CHLOROPHYLL : 2.68 CARBON : 283 NITROGEN : 53

NITRATE : .33 SILICATE : 3.32 PHOSPHATE : .54

LABRADOR SEA 1985

STATION NO. 3

LAT 54°31.2' N LONG 51°27.0' W DATE 03/07/85 DEPTH 35 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 698 | .11 | 538 | .17 | 458 | .18 | 419 | .19 |
| 379 | .36 | 319 | .35 | 159 | .64 | 140 | .63 |
| 140 | .56 | 120 | .72 | 56 | .73 | 52 | .78 |
| 50 | .53 | 46 | .65 | 44 | .49 | 22 | .53 |
| 22 | .56 | 20 | .56 | 18 | .36 | 18 | .35 |
| 10 | .24 | 8 | .11 | 8 | .21 | 6 | .14 |
| 6 | .16 | 3 | .12 | 3 | .05 | 3 | .12 |
| 3 | .07 | 3 | .05 | 3 | .04 | 2 | .05 |
| 1 | .03 | 1 | .02 | .4 | .01 | .3 | .01 |
| .3 | .01 | | | | | | |

PARAMETER VALUES

PS : 1.02 ( .93, 1.12 )

ALPHA : .030 ( .028, .032 )

BETA : .0034 ( .0027, .0041 )

FRACTION : <1 MICRON

SAMPLE TEMP 2.5°C INCUBATION TEMP 4.0°C

CHLOROPHYLL : .67 CARBON : 283 NITROGEN : 53

NITRATE : .33 SILICATE : 3.32 PHOSPHATE : .54

LABRADOR SEA 1985

STATION NO. 4

LAT 54° 6.6' N LONG 52°27.8' W DATE 04/07/85 DEPTH 15 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 136 | 1.72 | 108 | 1.52 | 80 | 1.33 | 76 | 1.25 |
| 76 | 1.36 | 46 | 1.26 | 40 | .89 | 36 | .78 |
| 34 | .69 | 28 | .62 | 16 | .46 | 13 | .39 |
| 11 | .25 | 11 | .22 | 11 | .22 | 4 | .21 |
| 3 | .11 | 3 | .08 | 3 | .08 | 3 | .08 |
| 2 | .07 | 2 | .03 | 1 | .06 | 1 | .06 |
| 1 | .03 | .9 | .03 | .7 | .02 | .5 | .03 |
| .5 | .02 | .5 | .04 | .5 | .02 | .2 | .01 |
| .2 | .01 | .2 | .01 | .0 | .01 | .0 | .01 |
| .0 | .00 | | | | | | |

PARAMETER VALUES

PS : 1.92 ( .70, 3.15 )

ALPHA : .030 ( .028, .032 )

BETA : .0000 ( -.0064, .0064 )

FRACTION : WHOLE

SAMPLE TEMP 3.6°C INCUBATION TEMP 3.0°C

CHLOROPHYLL : 1.59 CARBON : 289 NITROGEN : 50

NITRATE : .11 SILICATE : 1.87 PHOSPHATE : .31

LABRADOR SEA 1985

STATION NO. 4

LAT 54° 6.6' N LONG 52°27.8' W DATE 04/07/85 DEPTH 15 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 558 | 1.54 | 518 | 1.39 | 399 | 1.43 | 367 | 1.41 |
| 343 | 1.41 | 171 | 1.50 | 128 | 1.39 | 120 | 1.20 |
| 120 | 1.42 | 50 | 1.27 | 46 | 1.08 | 44 | 1.03 |
| 42 | .84 | 21 | .64 | 19 | .52 | 18 | .38 |
| 18 | .38 | 17 | .30 | 7 | .22 | 6 | .15 |
| 6 | .11 | 6 | .08 | 6 | .11 | 3 | .06 |
| 2 | .03 | 2 | .02 | 2 | .03 | 2 | .02 |
| 1 | .02 | .9 | .01 | .9 | .00 | .3 | .01 |
| .3 | .01 | .2 | .00 | | | | |

PARAMETER VALUES

PS : 1.49 ( 1.40, 1.59 )

ALPHA : .034 ( .031, .036 )

BETA : .0001 ( -.0001, .0004 )

FRACTION : >1 MICRON

SAMPLE TEMP 3.6°C INCUBATION TEMP 3.0°C

CHLOROPHYLL : 1.06 CARBON : 289 NITROGEN : 50

NITRATE : .11 SILICATE : 1.87 PHOSPHATE : .31

LABRADOR SEA 1985

STATION NO. 4

LAT 54° 6.6' N LONG 52°27.8' W DATE 04/07/85 DEPTH 15 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 518 | 1.11 | 399 | .93 | 367 | 1.17 | 171 | 1.09 |
| 136 | 1.01 | 128 | .98 | 120 | .93 | 120 | .95 |
| 50 | 1.15 | 46 | 1.05 | 44 | .85 | 42 | .92 |
| 40 | .78 | 19 | .67 | 18 | .62 | 18 | .66 |
| 17 | .52 | 7 | .39 | 6 | .25 | 6 | .30 |
| 6 | .19 | 6 | .16 | 3 | .09 | 2 | .10 |
| 2 | .08 | 2 | .08 | 2 | .10 | 1 | .03 |
| .9 | .02 | .9 | .03 | .3 | .03 | .3 | .02 |
| .2 | .00 | | | | | | |

PARAMETER VALUES

PS : 1.04 ( .99, 1.08 )

ALPHA : .051 ( .047, .055 )

BETA : .0000 ( -.0002, .0002 )

FRACTION : <1 MICRON

SAMPLE TEMP 3.6°C INCUBATION TEMP 3.0°C

CHLOROPHYLL : .31

CARBON : 289

NITROGEN : 50

NITRATE : .11

SILICATE : 1.87

PHOSPHATE : .31

LABRADOR SEA 1985

STATION NO. 4

LAT 54° 6.6' N LONG 52°27.8' W DATE 04/07/85 DEPTH 5 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 678 | 1.02 | 618 | .94 | 578 | .99 | 518 | .71 |
| 458 | .69 | 223 | .95 | 215 | 1.08 | 203 | .83 |
| 187 | .92 | 110 | 1.15 | 84 | .99 | 78 | .89 |
| 34 | .76 | 34 | .77 | 31 | .85 | 28 | .62 |
| 28 | .59 | 26 | .45 | 26 | .45 | 15 | .45 |
| 10 | .22 | 10 | .15 | 10 | .12 | 10 | .13 |
| 9 | .12 | 4 | .11 | 4 | .03 | 4 | .05 |
| 4 | .02 | 4 | .05 | 3 | .03 | 2 | .03 |
| 1 | .03 | 1 | .01 | .5 | .02 | .5 | .01 |
| .5 | .01 | | | | | | |

PARAMETER VALUES

PS : 1.05 ( .97, 1.13 )

ALPHA : .031 ( .028, .034 )

BETA : .0003 ( .0001, .0005 )

FRACTION : WHOLE

SAMPLE TEMP 3.6°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : 1.66 CARBON : 406 NITROGEN : 60

NITRATE : .14 SILICATE : 1.77 PHOSPHATE : .27

LABRADOR SEA 1985

STATION NO. 5

LAT 54° 1.5' N LONG 52°43.1' W DATE 04/07/85 DEPTH 19 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 167 | 1.15 | 136 | 1.21 | 108 | 1.05 | 80 | .90 |
| 76 | .93 | 76 | .77 | 40 | .63 | 36 | .53 |
| 34 | .51 | 28 | .47 | 16 | .42 | 13 | .33 |
| 11 | .25 | 11 | .23 | 11 | .17 | 4 | .14 |
| 3 | .08 | 3 | .10 | 3 | .07 | 3 | .05 |
| 2 | .03 | 1 | .02 | 1 | .03 | 1 | .02 |
| .7 | .01 | .5 | .01 | .5 | .00 | .5 | .00 |
| .5 | .00 | .2 | .00 | .2 | .02 | .2 | .03 |
| .0 | .00 | .0 | .00 | .0 | .01 | | |

PARAMETER VALUES

PS : 1.24 ( .83, 1.65 )

ALPHA : .021 ( .020, .023 )

BETA : .0000 ( -.0021, .0021 )

FRACTION : WHOLE

SAMPLE TEMP 2.0°C INCUBATION TEMP 3.0°C

CHLOROPHYLL : 19.57 CARBON : 531 NITROGEN : 73

NITRATE : .37 SILICATE : 2.29 PHOSPHATE : .47

LABRADOR SEA 1985

STATION NO. 5

LAT 54° 1.5' N LONG 52°43.1' W DATE 04/07/85 DEPTH 19 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 777 | .43 | 558 | .59 | 518 | .79 | 399 | .89 |
| 367 | .97 | 343 | .95 | 207 | 1.01 | 171 | 1.10 |
| 136 | 1.04 | 128 | 1.01 | 120 | 1.05 | 120 | .97 |
| 72 | 1.06 | 50 | .83 | 46 | .78 | 44 | .83 |
| 42 | .77 | 40 | .67 | 22 | .74 | 21 | .62 |
| 19 | .45 | 18 | .36 | 18 | .39 | 17 | .36 |
| 7 | .21 | 6 | .15 | 6 | .13 | 6 | .13 |
| 6 | .11 | 3 | .13 | 3 | .07 | 2 | .06 |
| 2 | .03 | 2 | .05 | 2 | .04 | 1 | .03 |
| .9 | .02 | .9 | .02 | .3 | .01 | .3 | .01 |
| .2 | .01 | | | | | | |

PARAMETER VALUES

PS : 1.32
( 1.25, 1.38 )

ALPHA : .030
( .029, .032 )

BETA : .0015
( .0013, .0018 )

FRACTION : >1 MICRON

SAMPLE TEMP 2.0°C INCUBATION TEMP 3.0°C

CHLOROPHYLL : 22.21

CARBON : 531

NITROGEN : 73

NITRATE : .37

SILICATE : 2.29

PHOSPHATE : .47

LABRADOR SEA 1985

STATION NO. 5

LAT 54° 1.5' N LONG 52°43.1' W DATE 04/07/85 DEPTH 19 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 777 | .69 | 558 | .98 | 518 | 1.18 | 399 | .94 |
| 367 | .93 | 343 | 1.07 | 171 | 1.09 | 120 | 1.37 |
| 120 | 1.52 | 50 | 1.40 | 46 | 1.44 | 44 | 1.23 |
| 42 | 1.11 | 40 | 1.16 | 22 | 1.35 | 21 | 1.03 |
| 19 | .94 | 18 | .80 | 18 | .94 | 17 | .77 |
| 7 | .52 | 6 | .44 | 6 | .38 | 6 | .31 |
| 6 | .30 | 3 | .34 | 3 | .22 | 2 | .15 |
| 2 | .14 | 2 | .15 | 2 | .15 | 1 | .14 |
| .9 | .09 | .9 | .06 | .3 | .05 | .3 | .10 |
| .2 | .03 | | | | | | |

PARAMETER VALUES

PS : 1.48 ( 1.40, 1.55 )

ALPHA : .081 ( .075, .087 )

BETA : .0013 ( .0010, .0016 )

FRACTION : <1 MICRON

SAMPLE TEMP 2.0°C INCUBATION TEMP 3.0°C

CHLOROPHYLL : .31 CARBON : 531 NITROGEN : 73

NITRATE : .37 SILICATE : 2.29 PHOSPHATE : .47

LABRADOR SEA 1985

STATION NO. 6

LAT 53°12.3' N LONG 55° 1.0' W DATE 05/07/85 DEPTH 27 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 116 | .95 | 80 | .94 | 60 | .92 | 42 | .87 |
| 38 | .73 | 31 | .74 | 21 | .61 | 17 | .54 |
| 15 | .57 | 13 | .40 | 11 | .44 | 10 | .44 |
| 8 | .27 | 6 | .22 | 5 | .28 | 5 | .15 |
| 4 | .19 | 4 | .12 | 3 | .08 | 2 | .04 |
| 2 | .04 | 1 | .03 | 1 | .02 | .9 | .01 |
| .8 | .01 | .6 | .02 | .6 | .01 | .5 | .01 |
| .4 | .01 | .3 | .00 | .2 | .01 | .2 | .00 |
| .1 | .00 | .1 | .00 | | | | |

PARAMETER VALUES

PS : .96 ( .86, 1.06 )

ALPHA : .047 ( .044, .049 )

BETA : .0000 ( -.0010, .0010 )

FRACTION : WHOLE

SAMPLE TEMP -1.0°C INCUBATION TEMP 3.0°C

CHLOROPHYLL : 15.94 CARBON : 391 NITROGEN : 52

NITRATE : 5.83 SILICATE : 7.68 PHOSPHATE : 1.00

LABRADOR SEA 1985

STATION NO. 6

LAT 53°12.3' N LONG 55° 1.0' W DATE 05/07/85 DEPTH 27 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 658 | .23 | 538 | .29 | 399 | .48 | 359 | .55 |
| 311 | .69 | 287 | .76 | 171 | .81 | 151 | .82 |
| 140 | .84 | 124 | .85 | 104 | .84 | 92 | .84 |
| 54 | .78 | 44 | .80 | 38 | .65 | 30 | .61 |
| 28 | .59 | 25 | .56 | 18 | .54 | 16 | .41 |
| 12 | .36 | 10 | .29 | 9 | .27 | 7 | .17 |
| 5 | .14 | 4 | .13 | 3 | .11 | 3 | .09 |
| 3 | .15 | 3 | .07 | 2 | .05 | 2 | .04 |
| 2 | .04 | 1 | .04 | 1 | .03 | 1 | .03 |
| .8 | .02 | .4 | .01 | .4 | .01 | .3 | .01 |

PARAMETER VALUES

PS : 1.15 ( 1.11, 1.20 )

ALPHA : .033 ( .032, .035 )

BETA : .0024 ( .0022, .0027 )

FRACTION : >1 MICRON

SAMPLE TEMP -1.0°C INCUBATION TEMP 3.0°C

CHLOROPHYLL : 16.94 CARBON : 391 NITROGEN : 52

NITRATE : 5.83 SILICATE : 7.68 PHOSPHATE : 1.00

LABRADOR SEA 1985

STATION NO. 6

LAT 53°12.3' N LONG 55° 1.0' W DATE 05/07/85 DEPTH 27 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 538 | .17 | 399 | .24 | 359 | .30 | 311 | .39 |
| 287 | .53 | 171 | .48 | 151 | .52 | 140 | .57 |
| 104 | .76 | 92 | .73 | 54 | .73 | 38 | .62 |
| 30 | .54 | 28 | .60 | 25 | .59 | 22 | .65 |
| 18 | .66 | 16 | .58 | 12 | .54 | 10 | .44 |
| 9 | .40 | 7 | .36 | 5 | .34 | 4 | .30 |
| 3 | .23 | 3 | .20 | 3 | .21 | 3 | .20 |
| 2 | .11 | 2 | .11 | 2 | .09 | 1 | .09 |
| 1 | .07 | 1 | .05 | .8 | .03 | .4 | .03 |
| .4 | .05 | .3 | .05 | | | | |

PARAMETER VALUES

PS : .78 ( .74, .81 )

ALPHA : .071 ( .066, .077 )

BETA : .0018 ( .0015, .0021 )

FRACTION : <1 MICRON

SAMPLE TEMP -1.0°C INCUBATION TEMP 3.0°C

CHLOROPHYLL : .23 CARBON : 391 NITROGEN : 52

NITRATE : 5.83 SILICATE : 7.68 PHOSPHATE : 1.00

LABRADOR SEA 1985

STATION NO. 7

LAT 53° 5.8' N LONG 55°19.5' W DATE 05/07/85 DEPTH 10 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 80 | .92 | 60 | .79 | 46 | .76 | 42 | .87 |
| 38 | .74 | 31 | .61 | 27 | .86 | 21 | .65 |
| 17 | .55 | 13 | .44 | 11 | .44 | 10 | .48 |
| 8 | .32 | 6 | .23 | 5 | .15 | 4 | .15 |
| 4 | .14 | 3 | .14 | 2 | .08 | 2 | .05 |
| 1 | .04 | 1 | .07 | 1 | .01 | .9 | .02 |
| .8 | .01 | .6 | .01 | .6 | .02 | .5 | .01 |
| .4 | .01 | .3 | .01 | .3 | .01 | .3 | .01 |
| .3 | .01 | .2 | .00 | .2 | .01 | .1 | .01 |
| .1 | .01 | .1 | .01 | | | | |

PARAMETER VALUES

PS : .87 ( .72, 1.03 )

ALPHA : .052 ( .048, .056 )

BETA : .0000 ( -.0023, .0023 )

FRACTION : WHOLE

SAMPLE TEMP -1.0°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : 23.97 CARBON : 588 NITROGEN : 74

NITRATE : .19 SILICATE : 1.45 PHOSPHATE : .57

LABRADOR SEA 1985

STATION NO. 7

LAT 53° 5.8' N LONG 55°19.5' W DATE 05/07/85 DEPTH 10 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 658 | .43 | 538 | .64 | 399 | .84 | 359 | .83 |
| 311 | 1.21 | 287 | 1.06 | 171 | 1.11 | 151 | 1.16 |
| 140 | 1.07 | 124 | .99 | 104 | .95 | 92 | .99 |
| 54 | .97 | 44 | .94 | 38 | .90 | 30 | .81 |
| 28 | .78 | 25 | .70 | 22 | .80 | 18 | .59 |
| 16 | .47 | 12 | .39 | 10 | .38 | 9 | .32 |
| 9 | .42 | 7 | .30 | 5 | .17 | 4 | .15 |
| 3 | .14 | 3 | .14 | 3 | .10 | 3 | .17 |
| 2 | .07 | 2 | .05 | 2 | .06 | 1 | .05 |
| 1 | .05 | 1 | .05 | .8 | .05 | .4 | .03 |
| .4 | .02 | .3 | .03 | | | | |

PARAMETER VALUES

PS : 1.27 ( 1.21, 1.34 )

ALPHA : .044 ( .041, .047 )

BETA : .0014 ( .0011, .0017 )

FRACTION : >1 MICRON

SAMPLE TEMP -1.0°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : 23.93 CARBON : 588 NITROGEN : 74

NITRATE : .19 SILICATE : 1.45 PHOSPHATE : .57

LABRADOR SEA 1985

STATION NO. 7

LAT 53° 5.8' N LONG 55°19.5' W DATE 05/07/85 DEPTH 10 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 658 | .64 | 399 | .65 | 359 | .57 | 311 | .86 |
| 287 | .70 | 171 | .75 | 151 | .81 | 140 | .78 |
| 124 | .76 | 104 | .90 | 92 | .80 | 54 | .98 |
| 44 | .90 | 38 | .84 | 30 | .71 | 28 | .71 |
| 25 | .70 | 22 | .81 | 18 | .88 | 16 | .68 |
| 12 | .65 | 10 | .45 | 9 | .41 | 9 | .42 |
| 7 | .28 | 5 | .20 | 4 | .17 | 3 | .14 |
| 3 | .19 | 3 | .12 | 3 | .14 | 2 | .14 |
| 1 | .15 | 1 | .12 | 1 | .11 | .8 | .12 |
| .4 | .13 | .4 | .09 | .3 | .10 | | |

PARAMETER VALUES

PS : .91 ( .87, .95 )

ALPHA : .070 ( .064, .076 )

BETA : .0007 ( .0005, .0008 )

FRACTION : <1 MICRON

SAMPLE TEMP -1.0°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : .36 CARBON : 588 NITROGEN : 74

NITRATE : .19 SILICATE : 1.45 PHOSPHATE : .57

LABRADOR SEA 1985

STATION NO. 8

LAT 54°29.1' N LONG 55°19.0' W DATE 06/07/85 DEPTH 20 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 116 | .84 | 80 | 1.06 | 60 | 1.04 | 46 | .87 |
| 42 | .98 | 38 | .79 | 31 | .71 | 27 | .87 |
| 21 | .65 | 17 | .63 | 15 | .76 | 13 | .59 |
| 11 | .54 | 10 | .59 | 8 | .43 | 6 | .27 |
| 5 | .38 | 5 | .26 | 4 | .24 | 4 | .23 |
| 3 | .16 | 2 | .11 | 2 | .10 | 2 | .11 |
| 1 | .08 | 1 | .08 | 1 | .08 | .9 | .08 |
| .8 | .05 | .6 | .04 | .6 | .07 | .5 | .04 |
| .4 | .02 | .3 | .03 | .3 | .02 | .3 | .03 |
| .3 | .02 | .2 | .02 | .2 | .02 | .1 | .02 |
| .1 | .01 | | | | | | |

PARAMETER VALUES

PS : .97 ( .89, 1.05 )

ALPHA : .070 ( .066, .075 )

BETA : .0003 ( -.0007, .0014 )

FRACTION : WHOLE

SAMPLE TEMP -1.0°C INCUBATION TEMP .0°C

CHLOROPHYLL : 5.94 CARBON : 261 NITROGEN : 42

NITRATE : 4.37 SILICATE : 7.65 PHOSPHATE : .86

LABRADOR SEA 1985

STATION NO. 8

LAT 54°29.1' N LONG 55°19.0' W DATE 06/07/85 DEPTH 20 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 658 | .27 | 538 | .42 | 399 | .49 | 359 | .55 |
| 311 | .66 | 287 | .74 | 171 | .82 | 151 | .78 |
| 140 | .92 | 104 | .85 | 92 | .77 | 54 | .84 |
| 44 | .76 | 38 | .69 | 30 | .76 | 28 | .76 |
| 25 | .60 | 22 | .70 | 18 | .65 | 16 | .51 |
| 12 | .42 | 10 | .32 | 9 | .29 | 7 | .29 |
| 5 | .19 | 4 | .16 | 3 | .18 | 3 | .12 |
| 3 | .10 | 3 | .12 | 2 | .06 | 2 | .06 |
| 2 | .04 | 1 | .03 | 1 | .05 | 1 | .02 |
| .8 | .03 | .4 | .01 | .4 | .01 | .3 | .01 |

PARAMETER VALUES

PS : 1.04 ( 1.00, 1.08 )

ALPHA : .045 ( .043, .047 )

BETA : .0018 ( .0015, .0020 )

FRACTION : >1 MICRON

SAMPLE TEMP -1.0°C INCUBATION TEMP .0°C

CHLOROPHYLL : 6.41 CARBON : 261 NITROGEN : 42

NITRATE : 4.37 SILICATE : 7.65 PHOSPHATE : .86

LABRADOR SEA 1985

STATION NO. 8

LAT 54°29.1' N LONG 55°19.0' W DATE 06/07/85 DEPTH 20 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 658 | .14 | 538 | .10 | 399 | .16 | 311 | .18 |
| 287 | .22 | 104 | .52 | 54 | .54 | 44 | .44 |
| 38 | .47 | 30 | .44 | 28 | .44 | 25 | .44 |
| 22 | .54 | 18 | .45 | 16 | .52 | 12 | .37 |
| 10 | .32 | 9 | .36 | 9 | .41 | 7 | .28 |
| 5 | .25 | 4 | .20 | 3 | .24 | 3 | .19 |
| 3 | .16 | 3 | .12 | 2 | .10 | 2 | .14 |
| 2 | .10 | 1 | .17 | 1 | .08 | 1 | .11 |
| .8 | .03 | .4 | .07 | .4 | .01 | .3 | .03 |

PARAMETER VALUES

PS : .55 ( .52, .57 )

ALPHA : .068 ( .063, .074 )

BETA : .0016 ( .0013, .0018 )

FRACTION : <1 MICRON

SAMPLE TEMP -1.0°C INCUBATION TEMP .0°C

CHLOROPHYLL : .15 CARBON : 261 NITROGEN : 42

NITRATE : 4.37 SILICATE : 7.65 PHOSPHATE : .86

LABRADOR SEA 1985

STATION NO. 9

LAT 55°31.8' N LONG 55°10.0' W DATE 07/07/85 DEPTH 40 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 558 | .73 | 439 | .59 | 379 | 1.20 | 279 | 1.37 |
| 255 | 1.58 | 148 | 1.68 | 136 | 1.62 | 116 | 1.75 |
| 100 | 1.67 | 62 | 1.89 | 23 | 1.73 | 20 | 1.71 |
| 19 | 1.83 | 17 | 1.24 | 15 | 1.38 | 14 | .98 |
| 8 | .87 | 5 | .86 | 5 | .48 | 4 | .44 |
| 4 | .38 | 3 | .43 | 3 | .25 | 2 | .25 |
| 2 | .25 | 2 | .17 | 2 | .13 | 1 | .19 |
| .9 | .09 | .9 | .11 | .5 | .13 | .4 | .08 |
| .4 | .06 | | | | | | |

PARAMETER VALUES

PS : 2.24 ( 2.12, 2.37 )

ALPHA : .140 ( .130, .150 )

BETA : .0045 ( .0037, .0054 )

FRACTION : WHOLE

SAMPLE TEMP 2.0°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : .18 CARBON : 191 NITROGEN : 37

NITRATE : 9.95 SILICATE : 5.64 PHOSPHATE : .90

LABRADOR SEA 1985

STATION NO. 9

LAT 55°31.8' N LONG 55°10.0' W DATE 07/07/85 DEPTH 20 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 578 | 1.37 | 458 | 1.49 | 379 | 1.49 | 355 | 1.49 |
| 331 | 1.65 | 311 | 1.63 | 167 | 1.59 | 136 | 1.54 |
| 120 | 1.50 | 112 | 1.31 | 112 | 1.59 | 104 | 1.25 |
| 62 | 1.42 | 50 | 1.40 | 46 | .97 | 46 | 1.24 |
| 46 | 1.11 | 44 | 1.02 | 23 | .92 | 20 | .82 |
| 19 | .57 | 18 | .48 | 16 | .41 | 16 | .40 |
| 7 | .39 | 6 | .29 | 6 | .20 | 5 | .14 |
| 5 | .10 | 4 | .05 | 3 | .14 | 3 | .14 |
| 2 | .05 | 2 | .04 | 2 | .03 | 2 | .04 |
| .9 | .06 | .8 | .00 | .7 | .02 | .4 | .02 |
| .4 | .01 | .3 | .03 | | | | |

PARAMETER VALUES

PS : 1.62 ( 1.54, 1.71 )

ALPHA : .042 ( .040, .045 )

BETA : .0003 ( .0001, .0006 )

FRACTION : WHOLE

SAMPLE TEMP 4.3°C INCUBATION TEMP 3.5°C

CHLOROPHYLL : .75 CARBON : 224 NITROGEN : 49

NITRATE : .93 SILICATE : 2.01 PHOSPHATE : .31

LABRADOR SEA 1985

STATION NO. 9

LAT 55°31.8' N LONG 55°10.0' W DATE 07/07/85 DEPTH 1 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 738 | 1.73 | 606 | 1.72 | 458 | 2.22 | 439 | 2.91 |
| 259 | 3.05 | 219 | 2.58 | 203 | 2.99 | 187 | 2.24 |
| 175 | 2.42 | 163 | 2.32 | 86 | 2.51 | 70 | 2.28 |
| 64 | 1.61 | 64 | 1.52 | 62 | 1.29 | 62 | 1.17 |
| 30 | 1.41 | 29 | 1.05 | 26 | .87 | 23 | .72 |
| 22 | .59 | 18 | .44 | 8 | .40 | 7 | .30 |
| 6 | .22 | 5 | .21 | 4 | .15 | 4 | .17 |
| 3 | .07 | 3 | .11 | 2 | .09 | 2 | .11 |
| 2 | .09 | 1 | .11 | 1 | .07 | 1 | .03 |
| .7 | .04 | .6 | .01 | .6 | .01 | | |

PARAMETER VALUES

PS : 4.12 ( 3.40, 4.84 )

ALPHA : .037 ( .034, .040 )

BETA : .0049 ( .0026, .0072 )

FRACTION : WHOLE

SAMPLE TEMP 4.6°C INCUBATION TEMP 3.5°C

CHLOROPHYLL : .66 CARBON : 179 NITROGEN : 42

NITRATE : .81 SILICATE : 2.09 PHOSPHATE : .30

LABRADOR SEA 1985

STATION NO. 10

LAT 54°33.0' N LONG 53°14.0' W DATE 08/07/8 DEPTH 1 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 618 | 1.41 | 478 | 1.55 | 379 | 1.56 | 283 | 1.50 |
| 235 | 1.61 | 211 | 1.48 | 207 | 1.62 | 128 | 1.69 |
| 108 | 1.58 | 88 | 1.58 | 68 | 1.61 | 68 | 1.77 |
| 50 | 1.65 | 42 | 1.52 | 35 | 1.33 | 30 | 1.42 |
| 24 | 1.18 | 23 | 1.39 | 19 | 1.01 | 15 | .75 |
| 13 | .75 | 10 | .82 | 8 | .63 | 6 | .33 |
| 5 | .27 | 5 | .26 | 4 | .29 | 3 | .16 |
| 2 | .15 | 2 | .12 | 2 | .06 | 2 | .10 |
| 1 | .11 | 1 | .05 | .9 | .02 | .7 | .02 |
| .6 | .01 | .5 | .01 | .4 | .01 | | |

PARAMETER VALUES

PS : 1.73 ( 1.69, 1.78 )

ALPHA : .084 ( .080, .088 )

BETA : .0006 ( .0004, .0008 )

FRACTION : WHOLE

SAMPLE TEMP 1.1°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : 4.73 CARBON : 554 NITROGEN : 69

NITRATE : .26 SILICATE : 1.63 PHOSPHATE : .61

LABRADOR SEA 1985

STATION NO. 10

LAT 54°33.0' N LONG 53°14.0' W DATE 08/07/8 DEPTH 10

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 678 | .66 | 538 | .81 | 419 | 1.14 | 283 | 1.33 |
| 243 | 1.57 | 187 | 1.44 | 155 | 1.74 | 128 | 1.62 |
| 88 | 1.49 | 68 | 1.30 | 64 | 1.54 | 44 | 1.09 |
| 38 | 1.25 | 35 | 1.01 | 31 | 1.15 | 21 | .96 |
| 18 | .78 | 16 | .69 | 13 | .59 | 11 | .54 |
| 9 | .69 | 7 | .46 | 5 | .27 | 4 | .29 |
| 3 | .18 | 3 | .19 | 3 | .20 | 3 | .11 |
| 2 | .13 | 2 | .06 | 2 | .07 | 1 | .12 |
| 1 | .09 | .9 | .04 | .8 | .06 | .6 | .02 |
| .4 | .03 | .3 | .02 | .2 | .01 | | |

PARAMETER VALUES

PS : 2.00 ALPHA : .054 BETA : .0030

( 1.89, 2.10 ) ( .051, .057 ) ( .0024, .0035 )

FRACTION : WHOLE

SAMPLE TEMP 1.1°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : 13.85 CARBON : 413 NITROGEN : 71

NITRATE : 2.84 SILICATE : 5.00 PHOSPHATE : .86

LABRADOR SEA 1985

STATION NO. 10

LAT 54°33.0' N LONG 53°14.0' W DATE 08/07/8 DEPTH 20

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 658 | .58 | 478 | .87 | 359 | 1.01 | 335 | 1.51 |
| 283 | 1.84 | 239 | 2.06 | 163 | 2.10 | 140 | 2.34 |
| 84 | 2.01 | 76 | 2.19 | 35 | 1.64 | 28 | 1.86 |
| 25 | 1.63 | 21 | 1.56 | 15 | 1.82 | 12 | 1.50 |
| 11 | 1.29 | 10 | 1.15 | 8 | .77 | 8 | .90 |
| 6 | .75 | 5 | .62 | 4 | .46 | 3 | .41 |
| 3 | .39 | 3 | .25 | 3 | .27 | 2 | .23 |
| 2 | .21 | 2 | .20 | 1 | .15 | 1 | .11 |
| 1 | .10 | .9 | .08 | .4 | .08 | .3 | .04 |
| .2 | .02 | | | | | | |

PARAMETER VALUES

PS : 2.66 ( 2.49, 2.82 )

ALPHA : .138 ( .128, .148 )

BETA : .0050 ( .0040, .0060 )

FRACTION : WHOLE

SAMPLE TEMP -.9°C INCUBATION TEMP .0°C

CHLOROPHYLL : 3.03

CARBON : 245

NITROGEN : 46

NITRATE : 6.19

SILICATE : 9.04

PHOSPHATE : .89

LABRADOR SEA 1985

STATION NO. 10

LAT 54°33.0' N LONG 53°14.0' W DATE 08/07/8 DEPTH 30

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 86 | 3.57 | 54 | 3.89 | 44 | 3.70 | 27 | 3.08 |
| 24 | 4.43 | 21 | 4.64 | 16 | 3.65 | 12 | 2.78 |
| 9 | 2.14 | 9 | 1.83 | 7 | 1.22 | 6 | 1.09 |
| 5 | 1.49 | 4 | 1.32 | 3 | 1.16 | 3 | .68 |
| 2 | .51 | 2 | .58 | 2 | .40 | 1 | .29 |
| 1 | .35 | 1 | .19 | .9 | .22 | .8 | .09 |
| .7 | .27 | .6 | .05 | .4 | .04 | .3 | .06 |
| .3 | .05 | .2 | .05 | .2 | .00 | .2 | .00 |
| .1 | .03 | | | | | | |

PARAMETER VALUES

PS : 6.64 ( 4.20, 9.07 )

ALPHA : .321 ( .290, .351 )

BETA : .0515 ( .0009, .1021 )

FRACTION : WHOLE

SAMPLE TEMP -1.1°C INCUBATION TEMP .0°C

CHLOROPHYLL : .50 CARBON : 176 NITROGEN : 30

NITRATE : 7.60 SILICATE : 10.84 PHOSPHATE : 1.09

LABRADOR SEA 1985

STATION NO. 11

LAT 53°10.4' N LONG 52°50.0' W DATE 09/07/8 DEPTH 1 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 458 | 1.29 | 335 | 1.15 | 275 | 1.13 | 231 | 1.20 |
| 191 | 1.24 | 144 | 1.29 | 116 | 1.30 | 100 | 1.17 |
| 92 | 1.05 | 76 | 1.25 | 70 | 1.24 | 56 | 1.14 |
| 46 | 1.16 | 39 | .97 | 31 | .80 | 28 | .75 |
| 26 | .83 | 22 | .68 | 19 | .47 | 16 | .37 |
| 14 | .28 | 11 | .25 | 10 | .30 | 7 | .17 |
| 6 | .14 | 6 | .11 | 5 | .07 | 4 | .07 |
| 4 | .09 | 3 | .08 | 3 | .03 | 3 | .03 |
| 2 | .03 | 2 | .03 | 2 | .02 | 1 | .01 |
| 1 | .01 | 1 | .02 | .9 | .04 | .8 | .02 |

PARAMETER VALUES

PS : 1.37 ( 1.28, 1.45 )

ALPHA : .038 ( .035, .040 )

BETA : .0005 ( .0001, .0008 )

FRACTION : WHOLE

SAMPLE TEMP 1.0°C INCUBATION TEMP 1.0°C

CHLOROPHYLL : 1.21 CARBON : 585 NITROGEN : 80

NITRATE : .30 SILICATE : .79 PHOSPHATE : .36

LABRADOR SEA 1985

STATION NO. 11

LAT 53°10.4' N LONG 52°50.0' W DATE 09/07/8 DEPTH 10

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 375 | 1.09 | 323 | 1.38 | 279 | 1.49 | 219 | 1.39 |
| 144 | 1.51 | 116 | 1.55 | 96 | 1.29 | 88 | 1.30 |
| 76 | 1.11 | 68 | 1.20 | 50 | 1.30 | 39 | 1.12 |
| 30 | .88 | 26 | 1.04 | 22 | .74 | 19 | .79 |
| 16 | .73 | 12 | .60 | 10 | .53 | 8 | .44 |
| 7 | .34 | 6 | .41 | 5 | .19 | 4 | .16 |
| 3 | .11 | 3 | .10 | 2 | .10 | 2 | .07 |
| 2 | .05 | 1 | .04 | 1 | .05 | 1 | .02 |
| .9 | .02 | .9 | .02 | .7 | .01 | .5 | .02 |
| .4 | .02 | .4 | .01 | .3 | .01 | | |

PARAMETER VALUES

PS : 1.44 ( 1.37, 1.51 )

ALPHA : .056 ( .052, .060 )

BETA : .0004 ( .0000, .0007 )

FRACTION : WHOLE

SAMPLE TEMP 1.0°C INCUBATION TEMP 1.0°C

CHLOROPHYLL : .85 CARBON : 330 NITROGEN : 62

NITRATE : .30 SILICATE : 1.19 PHOSPHATE : .41

LABRADOR SEA 1985

STATION NO. 11

LAT 53°10.4' N LONG 52°50.0' W DATE 09/07/8 DEPTH 30

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 777 | .08 | 578 | .14 | 478 | .21 | 399 | .30 |
| 315 | .39 | 291 | .45 | 195 | .83 | 151 | .88 |
| 124 | .90 | 108 | .89 | 84 | .91 | 76 | .90 |
| 62 | .96 | 44 | .93 | 36 | .72 | 33 | .68 |
| 29 | .60 | 26 | .66 | 24 | .82 | 19 | .63 |
| 14 | .47 | 12 | .43 | 10 | .42 | 8 | .42 |
| 6 | .23 | 5 | .18 | 4 | .16 | 4 | .16 |
| 3 | .13 | 3 | .14 | 3 | .11 | 2 | .08 |
| 2 | .07 | 2 | .04 | 1 | .07 | 1 | .04 |
| 1 | .03 | .8 | .03 | .5 | .01 | .4 | .01 |
| .3 | .01 | | | | | | |

PARAMETER VALUES

PS : 1.44
( 1.34, 1.53 )

ALPHA : .042
( .040, .044 )

BETA : .0054
( .0046, .0062 )

FRACTION : WHOLE

SAMPLE TEMP -1.1°C INCUBATION TEMP 1.0°C

CHLOROPHYLL : 20.26 CARBON : 419 NITROGEN : 67

NITRATE : 5.42 SILICATE : 1.82 PHOSPHATE : .87

LABRADOR SEA 1985

STATION NO. 11

LAT 53°10.4' N LONG 52°50.0' W DATE 09/07/8 DEPTH 50

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 50 | .55 | 42 | .81 | 29 | .72 | 15 | .99 |
| 12 | 1.10 | 11 | .78 | 9 | 1.00 | 9 | .73 |
| 6 | .72 | 5 | .56 | 4 | .96 | 4 | .88 |
| 3 | .63 | 3 | .53 | 2 | .33 | 2 | .38 |
| 1 | .27 | 1 | .24 | 1 | .21 | 1 | .20 |
| .9 | .21 | .7 | .20 | .6 | .16 | .5 | .15 |
| .4 | .09 | .3 | .11 | .2 | .09 | .2 | .31 |
| .2 | .03 | .2 | .10 | .2 | .04 | .1 | .07 |
| .1 | .06 | .1 | .01 | .0 | .03 | .0 | .05 |

PARAMETER VALUES

PS : 1.13 ( .99, 1.26 )

ALPHA : .283 ( .252, .314 )

BETA : .0132 ( .0069, .0195 )

FRACTION : WHOLE

SAMPLE TEMP -1.3°C INCUBATION TEMP 1.0°C

CHLOROPHYLL : .34 CARBON : 214 NITROGEN : 34

NITRATE : 10.80 SILICATE : 7.28 PHOSPHATE : .99

LABRADOR SEA 1985

STATION NO. 12

LAT 53°46.6' N LONG 51° 2.9' W DATE 09/07/8 DEPTH 45

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 518 | .19 | 375 | .28 | 323 | .38 | 279 | .55 |
| 255 | .69 | 219 | .74 | 144 | .75 | 116 | .97 |
| 96 | 1.01 | 88 | 1.06 | 76 | 1.15 | 68 | 1.07 |
| 50 | 1.23 | 39 | 1.14 | 30 | 1.04 | 26 | 1.06 |
| 22 | 1.11 | 19 | 1.02 | 16 | .94 | 12 | .86 |
| 10 | .74 | 8 | .65 | 7 | .58 | 6 | .65 |
| 6 | .56 | 5 | .41 | 4 | .35 | 3 | .30 |
| 3 | .21 | 2 | .22 | 2 | .17 | 2 | .17 |
| 1 | .10 | 1 | .09 | 1 | .14 | .9 | .04 |
| .9 | .09 | .7 | .04 | .5 | .04 | .4 | .03 |
| .4 | .02 | .3 | .02 | | | | |

PARAMETER VALUES

PS : 1.42 ( 1.38, 1.46 )

ALPHA : .109 ( .105, .113 )

BETA : .0050 ( .0046, .0055 )

FRACTION : WHOLE

SAMPLE TEMP 2.5°C INCUBATION TEMP 2.5°C

CHLOROPHYLL : .49 CARBON : 198 NITROGEN : 35

NITRATE : 6.43 SILICATE : 2.33 PHOSPHATE : .75

LABRADOR SEA 1985

STATION NO. 12

LAT 53°46.6' N LONG 51° 2.9' W DATE 09/07/8 DEPTH 45

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 518 | .25 | 375 | .18 | 323 | .37 | 279 | .42 |
| 255 | .77 | 219 | .56 | 144 | .87 | 96 | 1.35 |
| 88 | 1.20 | 76 | 1.21 | 68 | 1.34 | 50 | 1.47 |
| 30 | 1.30 | 26 | 1.30 | 22 | 1.25 | 19 | 1.43 |
| 12 | 1.35 | 10 | 1.01 | 8 | 1.06 | 7 | .91 |
| 6 | .83 | 6 | .69 | 5 | .53 | 4 | .37 |
| 3 | .39 | 3 | .24 | 2 | .35 | 2 | .19 |
| 2 | .16 | 1 | .12 | 1 | .05 | 1 | .06 |
| .9 | .18 | .9 | .06 | .7 | .03 | .5 | .10 |
| .4 | .01 | .4 | .05 | .3 | .07 | | |

PARAMETER VALUES

PS : 1.80 ( 1.71, 1.90 )

ALPHA : .157 ( .147, .167 )

BETA : .0084 ( .0072, .0096 )

FRACTION : >1 MICRON

SAMPLE TEMP 2.5°C INCUBATION TEMP 2.5°C

CHLOROPHYLL : .26 CARBON : 198 NITROGEN : 35

NITRATE : 6.43 SILICATE : 2.33 PHOSPHATE : .75

LABRADOR SEA 1985

STATION NO. 12

LAT 53°46.6' N LONG 51° 2.9' W DATE 09/07/8 DEPTH 45

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 618 | .06 | 458 | .15 | 335 | .12 | 275 | .13 |
| 231 | .19 | 195 | .31 | 191 | .29 | 144 | .29 |
| 116 | .29 | 100 | .33 | 92 | .39 | 70 | .40 |
| 46 | .40 | 39 | .38 | 31 | .43 | 26 | .41 |
| 22 | .42 | 14 | .36 | 11 | .32 | 10 | .37 |
| 7 | .34 | 6 | .27 | 6 | .25 | 5 | .25 |
| 4 | .23 | 4 | .23 | 3 | .15 | 3 | .13 |
| 3 | .12 | 2 | .07 | 2 | .06 | 2 | .08 |
| 1 | .07 | 1 | .02 | 1 | .03 | .9 | .01 |
| .8 | .01 | | | | | | |

PARAMETER VALUES

PS : .48 ( .46, .50 )

ALPHA : .062 ( .058, .067 )

BETA : .0016 ( .0014, .0018 )

FRACTION : <1 MICRON

SAMPLE TEMP 2.5°C INCUBATION TEMP 2.5°C

CHLOROPHYLL : .24

CARBON : 198

NITROGEN : 35

NITRATE : 6.43

SILICATE : 2.33

PHOSPHATE : .75

LABRADOR SEA 1985

STATION NO. 13

LAT 53° 3.6' N LONG 50°29.4' W DATE 10/07/8 DEPTH 1 M

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 618 | 3.43 | 335 | 2.67 | 275 | 2.88 | 231 | 3.24 |
| 195 | 3.04 | 191 | 2.88 | 116 | 3.45 | 100 | 3.36 |
| 92 | 2.93 | 76 | 2.62 | 70 | 2.92 | 56 | 3.22 |
| 46 | 2.24 | 39 | 1.99 | 31 | 2.02 | 28 | 1.41 |
| 26 | 2.01 | 22 | 1.21 | 19 | 1.37 | 16 | .81 |
| 14 | .89 | 11 | .75 | 10 | .64 | 7 | .41 |
| 6 | .33 | 6 | .21 | 5 | .17 | 4 | .17 |
| 4 | .16 | 3 | .04 | 3 | .08 | 2 | .06 |
| 2 | .04 | 1 | .03 | 1 | .04 | 1 | .02 |
| .9 | .03 | .8 | .04 | | | | |

PARAMETER VALUES

| PS : 3.27 | ALPHA : .086 | BETA : .0003 |
|---|---|---|
| ( 3.07, 3.47 ) | ( .080, .093 ) | ( -.0003, .0010 ) |

FRACTION : WHOLE

SAMPLE TEMP 6.3°C INCUBATION TEMP 6.0°C

| CHLOROPHYLL : .51 | CARBON : 242 | NITROGEN : 44 |
|---|---|---|
| NITRATE : .15 | SILICATE : .12 | PHOSPHATE : .28 |

LABRADOR SEA 1985

STATION NO. 13

LAT 53° 3.6' N LONG 50°29.4' W DATE 10/07/8 DEPTH 20

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 578 | 1.43 | 458 | 1.68 | 419 | 1.60 | 379 | 1.68 |
| 327 | 1.88 | 279 | 1.85 | 167 | 2.16 | 132 | 2.05 |
| 116 | 1.94 | 104 | 1.75 | 56 | 1.69 | 46 | 1.63 |
| 44 | 1.31 | 40 | 1.38 | 37 | 1.23 | 35 | 1.16 |
| 21 | 1.23 | 18 | .97 | 16 | .94 | 16 | .65 |
| 7 | .40 | 6 | .31 | 6 | .18 | 5 | .15 |
| 5 | .15 | 4 | .12 | 3 | .13 | 3 | .07 |
| 3 | .04 | 3 | .03 | 3 | .00 | 2 | .02 |
| 2 | .02 | 1 | .01 | .9 | .00 | .8 | .00 |
| .7 | .02 | | | | | | |

PARAMETER VALUES

PS : 2.34 ( 2.20, 2.48 )

ALPHA : .055 ( .052, .058 )

BETA : .0019 ( .0014, .0024 )

FRACTION : WHOLE

SAMPLE TEMP 6.3°C INCUBATION TEMP 6.0°C

CHLOROPHYLL : 1.67 CARBON : 230 NITROGEN : 46

NITRATE : .92 SILICATE : 1.23 PHOSPHATE : .42

LABRADOR SEA 1985

STATION NO. 13

LAT 53° 3.6' N LONG 50°29.4' W DATE 10/07/8 DEPTH 35

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 738 | .24 | 578 | .29 | 439 | .15 | 367 | .23 |
| 315 | .36 | 267 | .47 | 187 | 1.12 | 171 | 1.43 |
| 148 | 1.45 | 108 | 1.31 | 58 | 1.40 | 40 | 1.53 |
| 36 | 1.47 | 32 | 1.43 | 26 | 1.43 | 22 | 1.38 |
| 20 | 1.10 | 16 | .94 | 13 | .99 | 9 | .91 |
| 9 | 1.07 | 7 | .60 | 6 | .87 | 5 | .74 |
| 4 | .60 | 4 | .66 | 4 | .27 | 3 | .33 |
| 3 | .35 | 3 | .23 | 2 | .28 | 2 | .12 |
| 2 | .18 | 2 | .22 | 1 | .18 | 1 | .57 |
| .8 | .06 | .7 | .12 | | | | |

PARAMETER VALUES

PS : 1.95 ALPHA : .128 BETA : .0075

( 1.76, 2.13 ) ( .115, .142 ) ( .0057, .0093 )

FRACTION : WHOLE

SAMPLE TEMP 6.0°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : 1.69 CARBON : 239 NITROGEN : 47

NITRATE : 1.59 SILICATE : 1.73 PHOSPHATE : .51

LABRADOR SEA 1985

STATION NO. 13

LAT 53° 3.6' N LONG 50°29.4' W DATE 10/07/8 DEPTH 50

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 102 | 5.46 | 46 | 6.78 | 40 | 5.94 | 31 | 4.66 |
| 23 | 4.17 | 17 | 3.64 | 12 | 3.07 | 7 | 2.50 |
| 6 | 2.17 | 5 | 1.46 | 5 | 1.50 | 4 | 2.12 |
| 3 | 1.08 | 2 | .64 | 2 | .45 | 2 | .68 |
| 2 | .46 | 2 | .46 | 1 | .38 | 1 | .29 |
| 1 | .46 | 1 | .02 | .9 | .12 | .8 | .18 |
| .7 | .07 | .7 | .09 | .6 | .13 | .6 | .14 |
| .6 | .11 | .6 | .16 | .6 | .05 | .5 | .14 |
| .5 | .09 | .5 | .12 | | | | |

PARAMETER VALUES

PS : 9.58 ( 6.70, 12.45 )

ALPHA : .330 ( .306, .354 )

BETA : .0483 ( .0065, .0901 )

FRACTION : WHOLE

SAMPLE TEMP 3.5°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : 1.05

CARBON : 328

NITROGEN : 60

NITRATE : 3.89

SILICATE : 3.29

PHOSPHATE : .79

LABRADOR SEA 1985

STATION NO. 14

LAT 51°58.3' N LONG 54°40.2' W DATE 11/07/8 DEPTH 25

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 897 | .16 | 638 | .26 | 498 | .28 | 419 | .46 |
| 343 | .49 | 299 | .51 | 287 | .67 | 227 | .67 |
| 191 | .65 | 151 | .78 | 132 | .75 | 116 | .70 |
| 102 | .76 | 62 | .74 | 54 | .66 | 38 | .68 |
| 29 | .67 | 23 | .68 | 20 | .53 | 18 | .47 |
| 14 | .50 | 14 | .47 | 12 | .34 | 12 | .49 |
| 10 | .30 | 8 | .27 | 7 | .22 | 6 | .22 |
| 5 | .16 | 4 | .14 | 3 | .12 | 3 | .10 |
| 3 | .10 | 2 | .05 | 2 | .07 | 2 | .04 |
| 2 | .04 | 1 | .03 | .9 | .02 | .8 | .02 |

PARAMETER VALUES

PS : .93 ( .90, .97 )

ALPHA : .042 ( .040, .044 )

BETA : .0017 ( .0015, .0019 )

FRACTION : WHOLE

SAMPLE TEMP -1.0°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : 1.66 CARBON : 310 NITROGEN : 51

NITRATE : .10 SILICATE : 1.17 PHOSPHATE : .80

LABRADOR SEA 1985

STATION NO. 14

LAT 51°58.3' N LONG 54°40.2' W DATE 11/07/8 DEPTH 25

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 857 | .14 | 578 | .20 | 478 | .27 | 355 | .28 |
| 327 | .30 | 287 | .40 | 235 | .60 | 191 | .57 |
| 155 | .61 | 128 | .64 | 108 | .62 | 92 | .57 |
| 76 | .60 | 54 | .58 | 46 | .59 | 39 | .60 |
| 30 | .49 | 28 | .55 | 26 | .47 | 22 | .43 |
| 18 | .40 | 16 | .37 | 13 | .30 | 12 | .35 |
| 9 | .31 | 8 | .19 | 6 | .13 | 6 | .15 |
| 5 | .13 | 4 | .10 | 4 | .10 | 3 | .05 |
| 3 | .04 | 3 | .04 | 2 | .04 | 2 | .05 |
| 2 | .04 | 2 | .06 | 1 | .05 | .9 | .00 |
| .8 | .01 | .8 | .01 | | | | |

PARAMETER VALUES

PS : .82 ( .78, .86 )

ALPHA : .031 ( .029, .032 )

BETA : .0019 ( .0017, .0022 )

FRACTION : >1 MICRON

SAMPLE TEMP -1.0°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : 1.77

CARBON : 310

NITROGEN : 51

NITRATE : .10

SILICATE : 1.17

PHOSPHATE : .80

LABRADOR SEA 1985

STATION NO. 14

LAT 51°58.3' N LONG 54°40.2' W DATE 11/07/8 DEPTH 25

| I | P | I | P | I | P | I | P |
|---|---|---|---|---|---|---|---|
| 857 | 1.25 | 478 | 1.62 | 355 | 1.48 | 287 | 1.66 |
| 128 | 1.40 | 108 | 1.28 | 54 | 1.39 | 39 | .97 |
| 30 | 1.04 | 26 | .83 | 22 | .66 | 18 | .56 |
| 16 | .49 | 13 | .37 | 12 | .40 | 9 | .42 |
| 8 | .46 | 6 | .45 | 6 | .22 | 5 | .35 |
| 4 | .23 | 3 | .06 | 3 | .18 | 2 | .16 |
| 2 | .13 | 1 | .16 | .9 | .05 | | |

PARAMETER VALUES

PS : 1.56 ( 1.46, 1.66 )

ALPHA : .046 ( .042, .050 )

BETA : .0002 ( .0000, .0005 )

FRACTION : <1 MICRON

SAMPLE TEMP -1.0°C INCUBATION TEMP 2.0°C

CHLOROPHYLL : .09

CARBON : 310

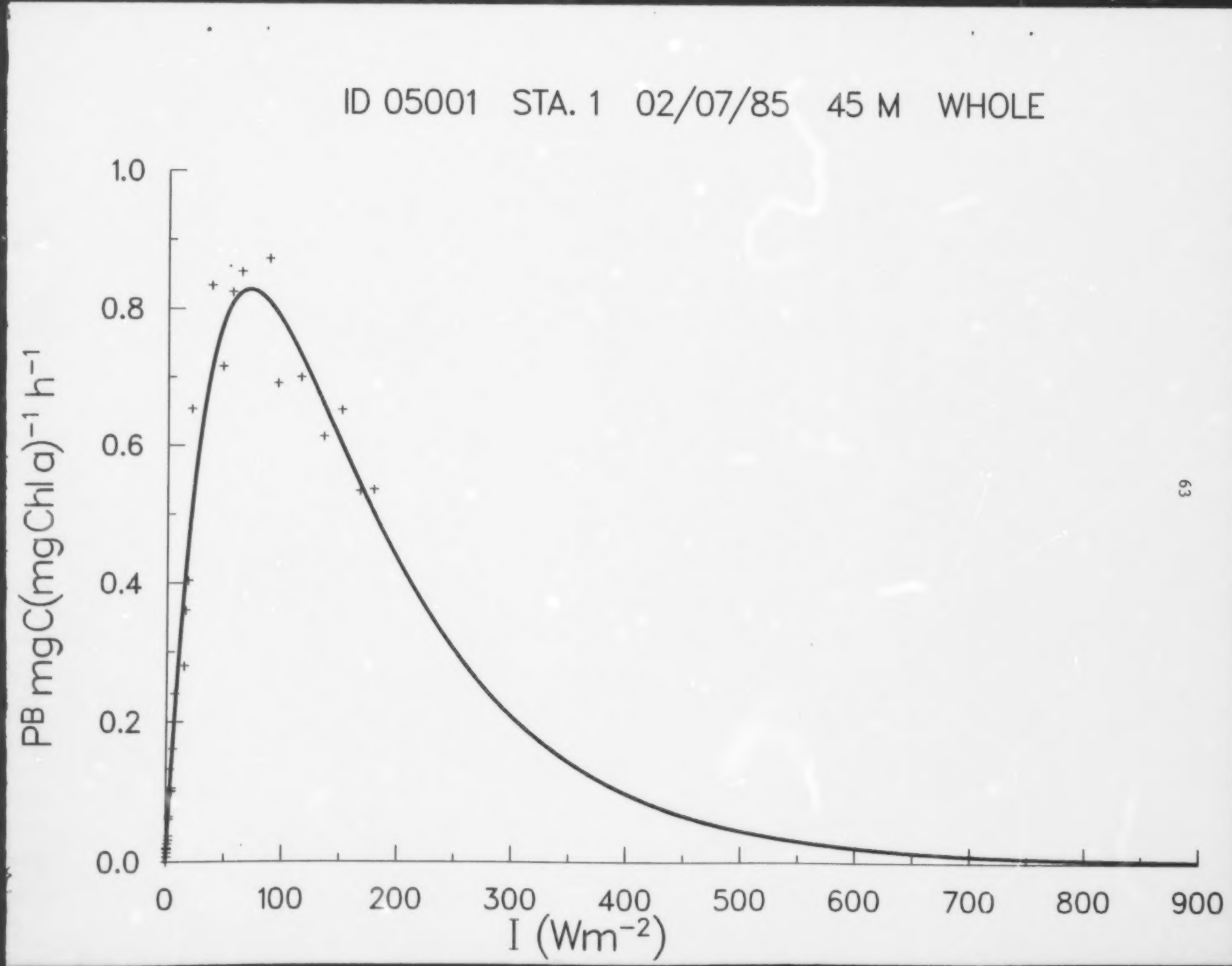
NITROGEN : 51

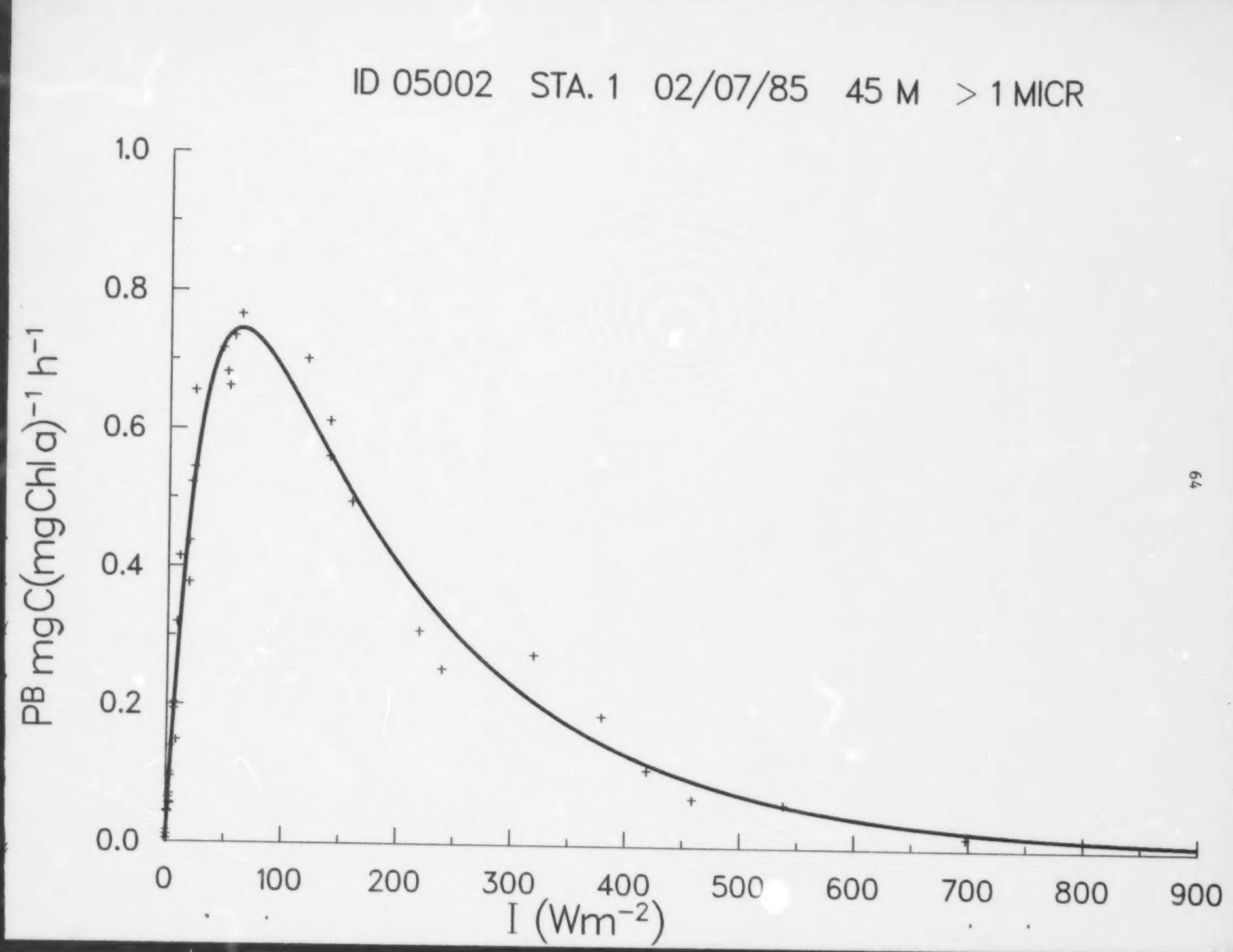
NITRATE : .10

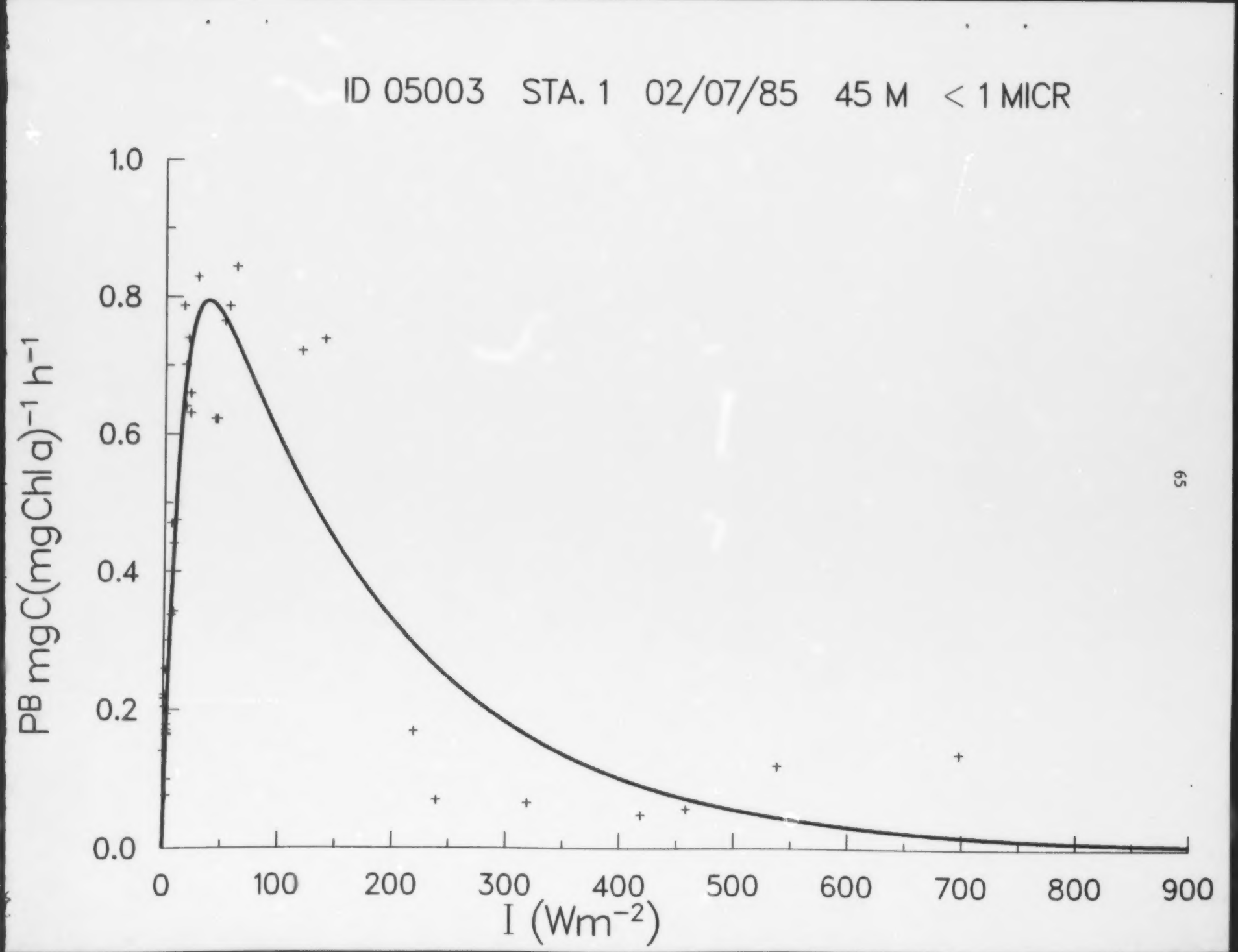
SILICATE : 1.17

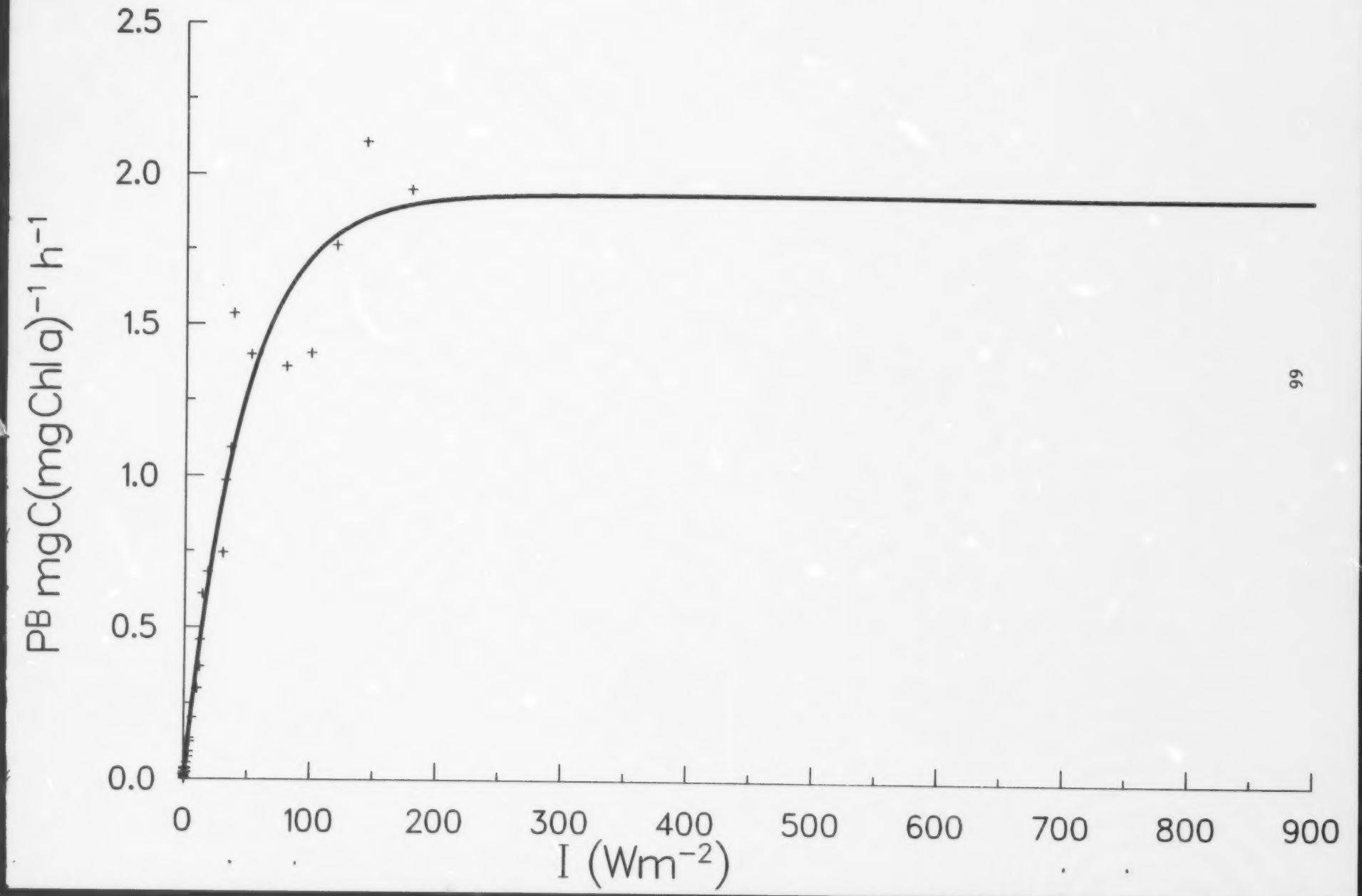
PHOSPHATE : .80

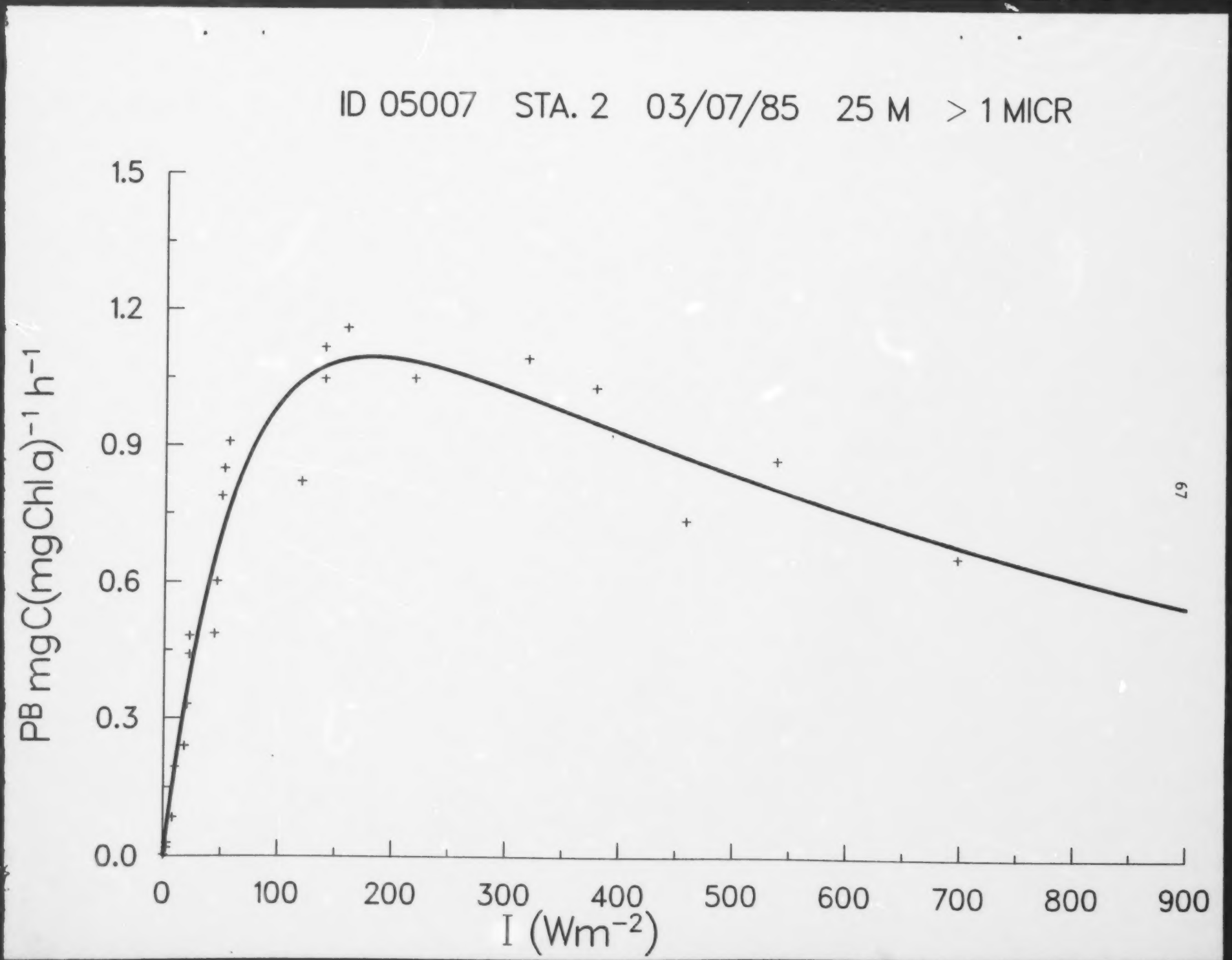
# SOLID LINE FIT TO PI DATA

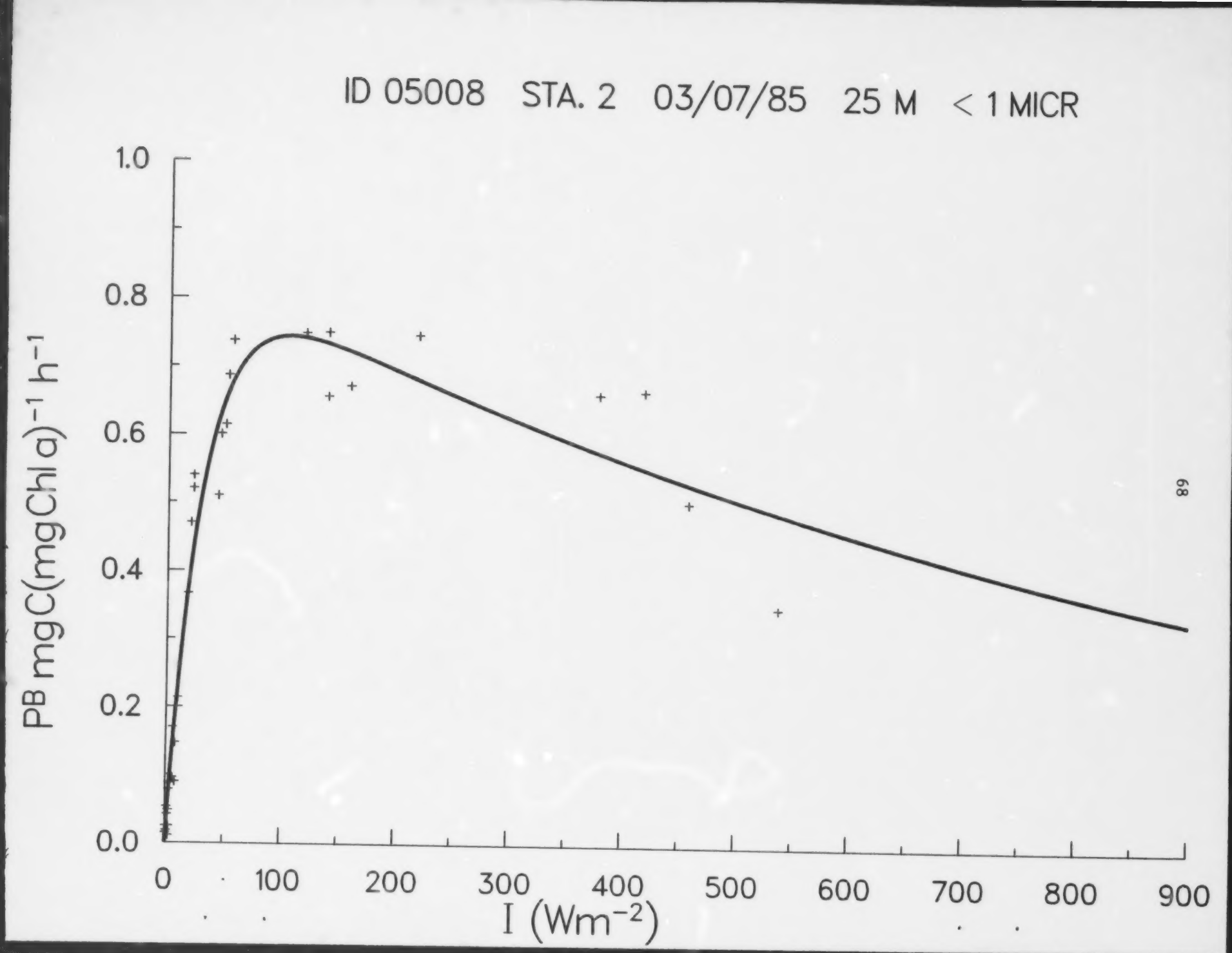

ID 05001 STA. 1 02/07/85 45 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

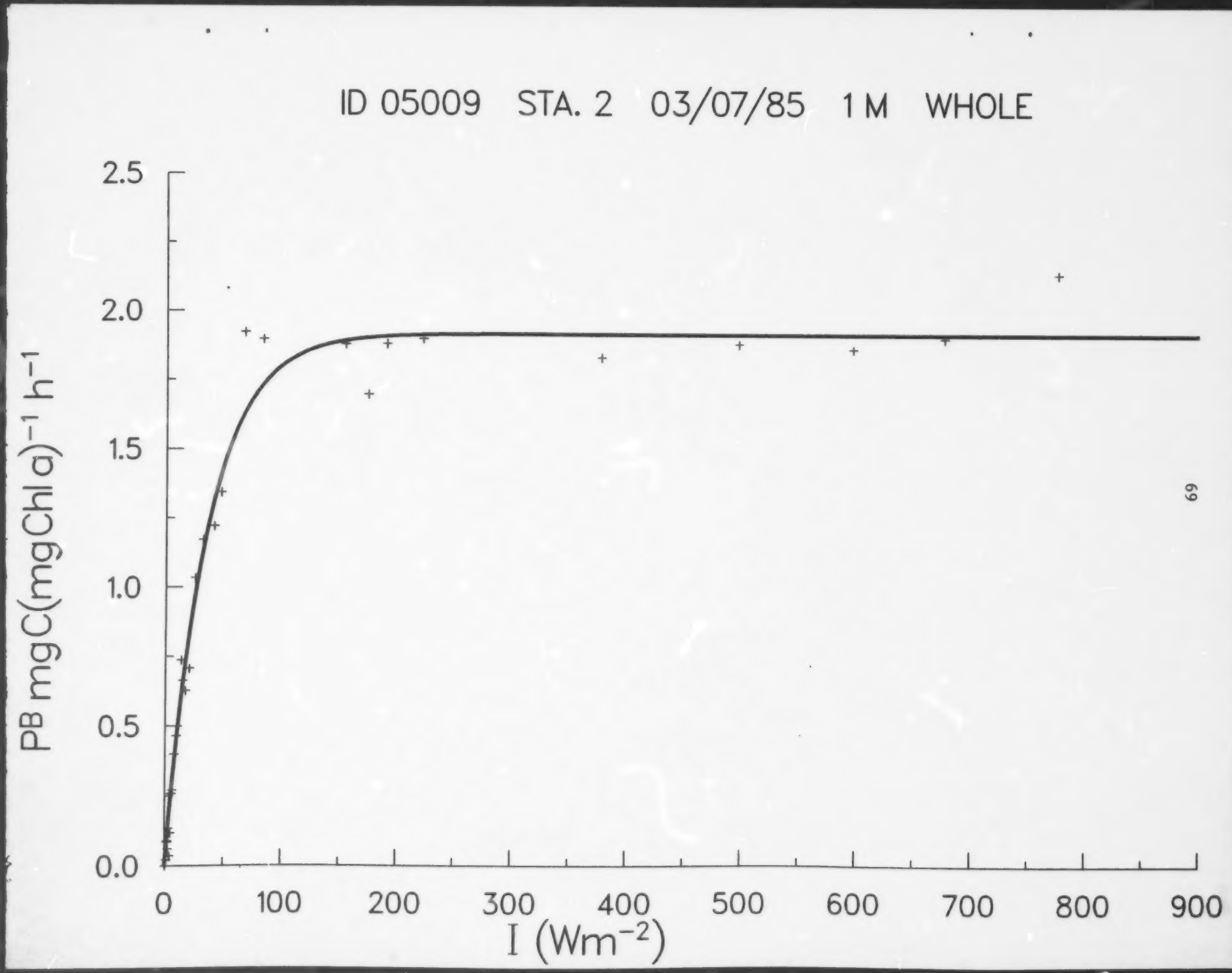

ID 05002 STA. 1 02/07/85 45 M > 1 MICR
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

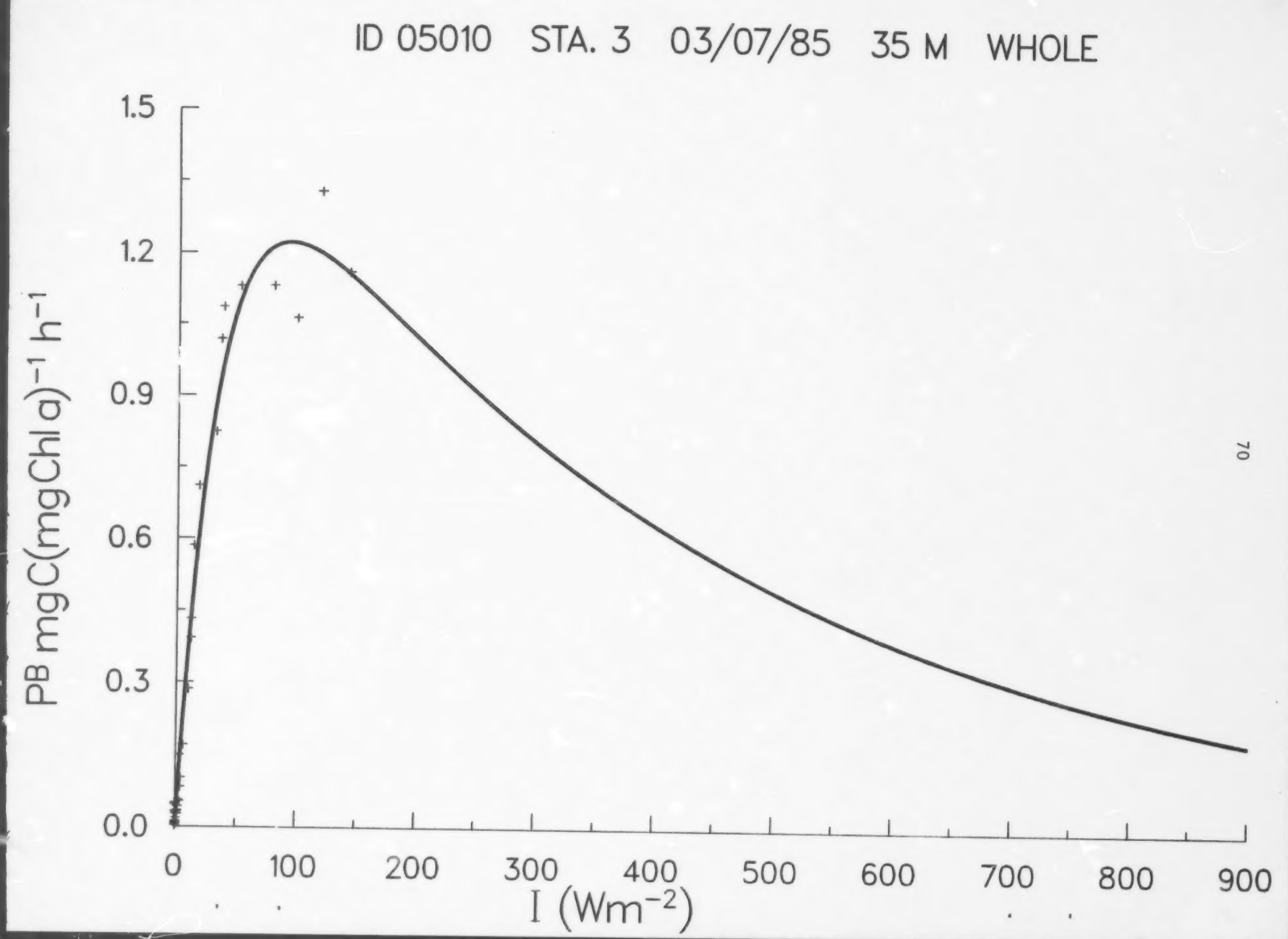

ID 05003 STA. 1 02/07/85 45 M < 1 MICR
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

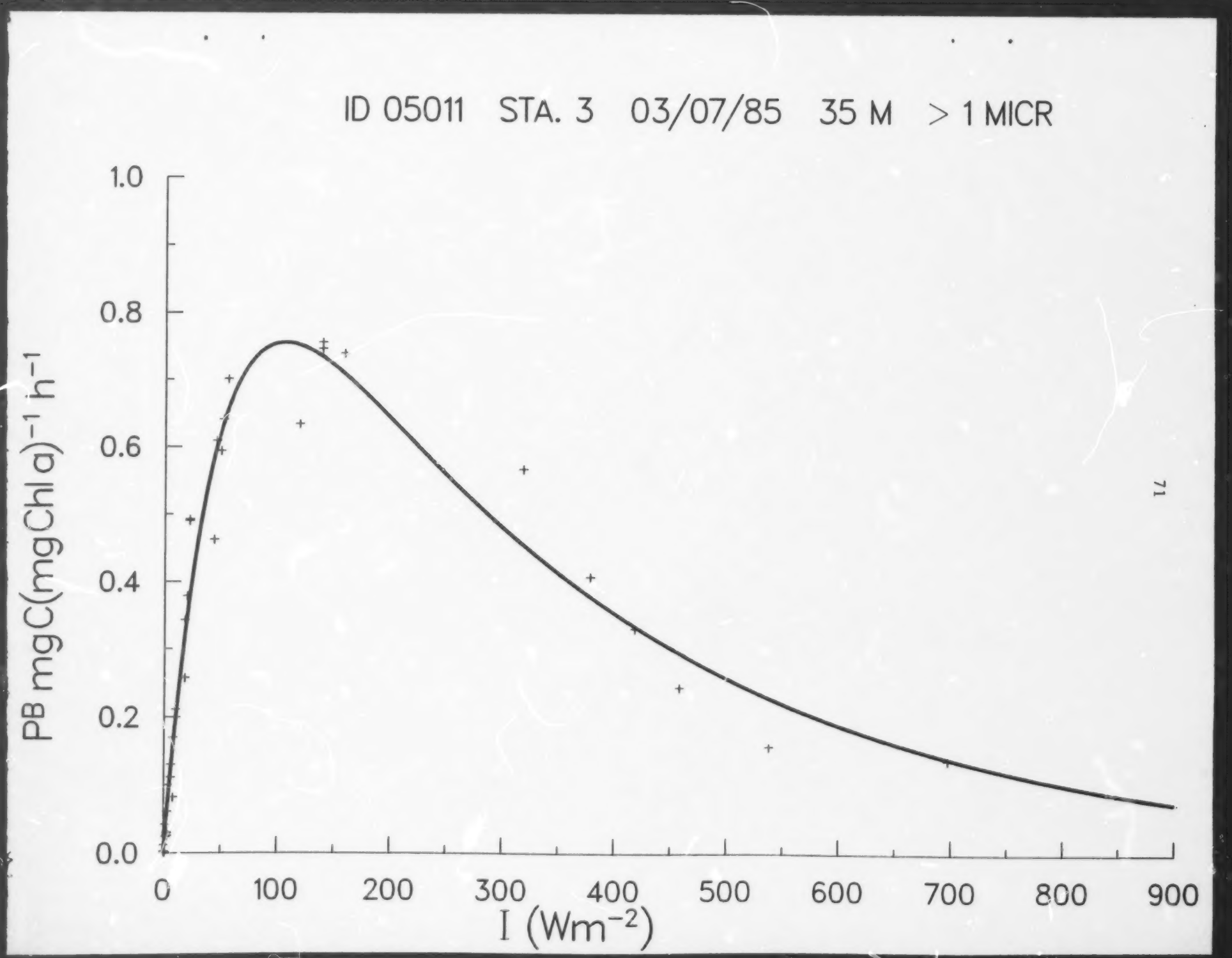

ID 05006 STA. 2 03/07/85 25 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
2.5
2.0
1.5
1.0
0.5
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
99

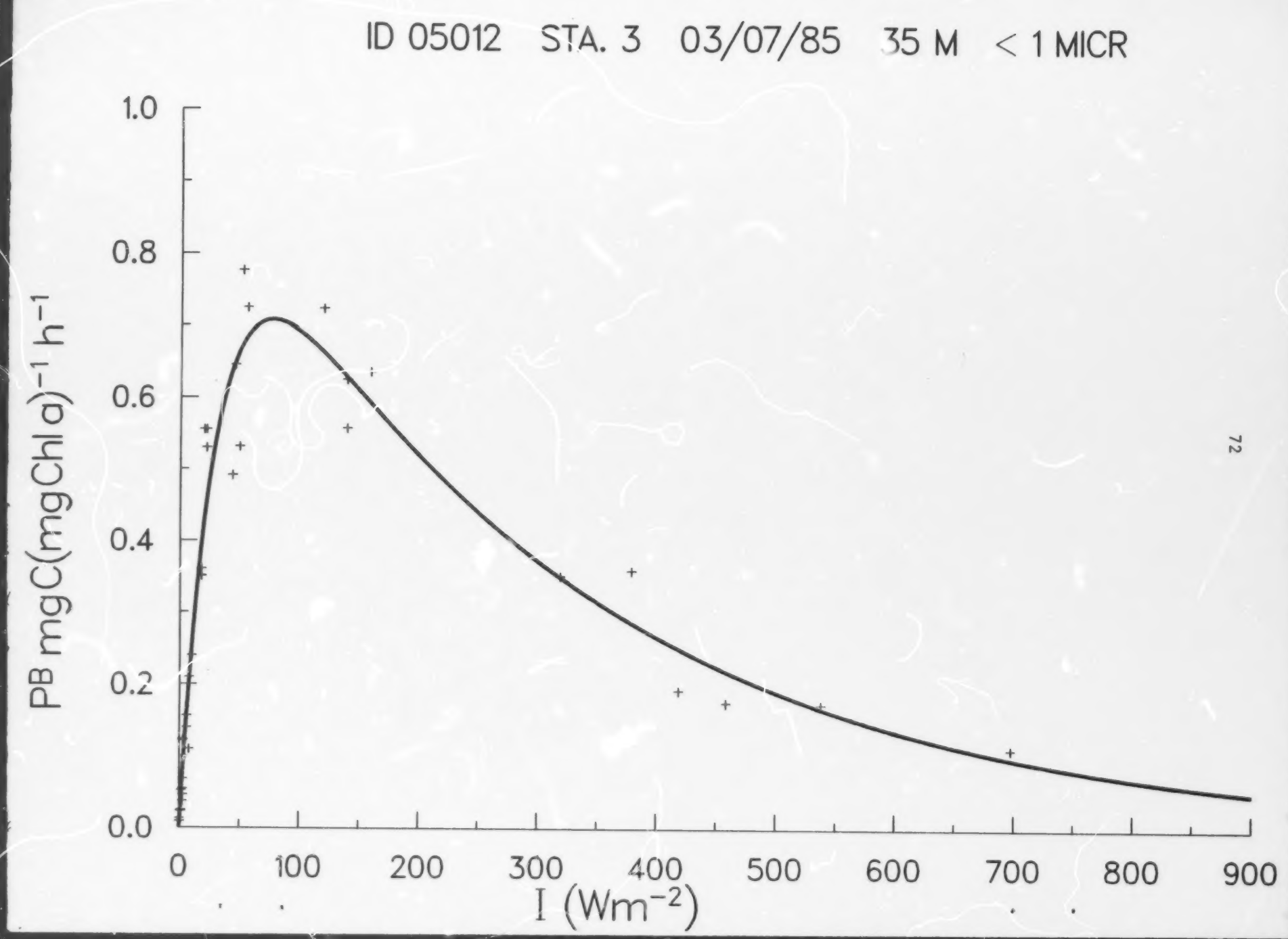

ID 05007 STA. 2 03/07/85 25 M > 1 MICR
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
67

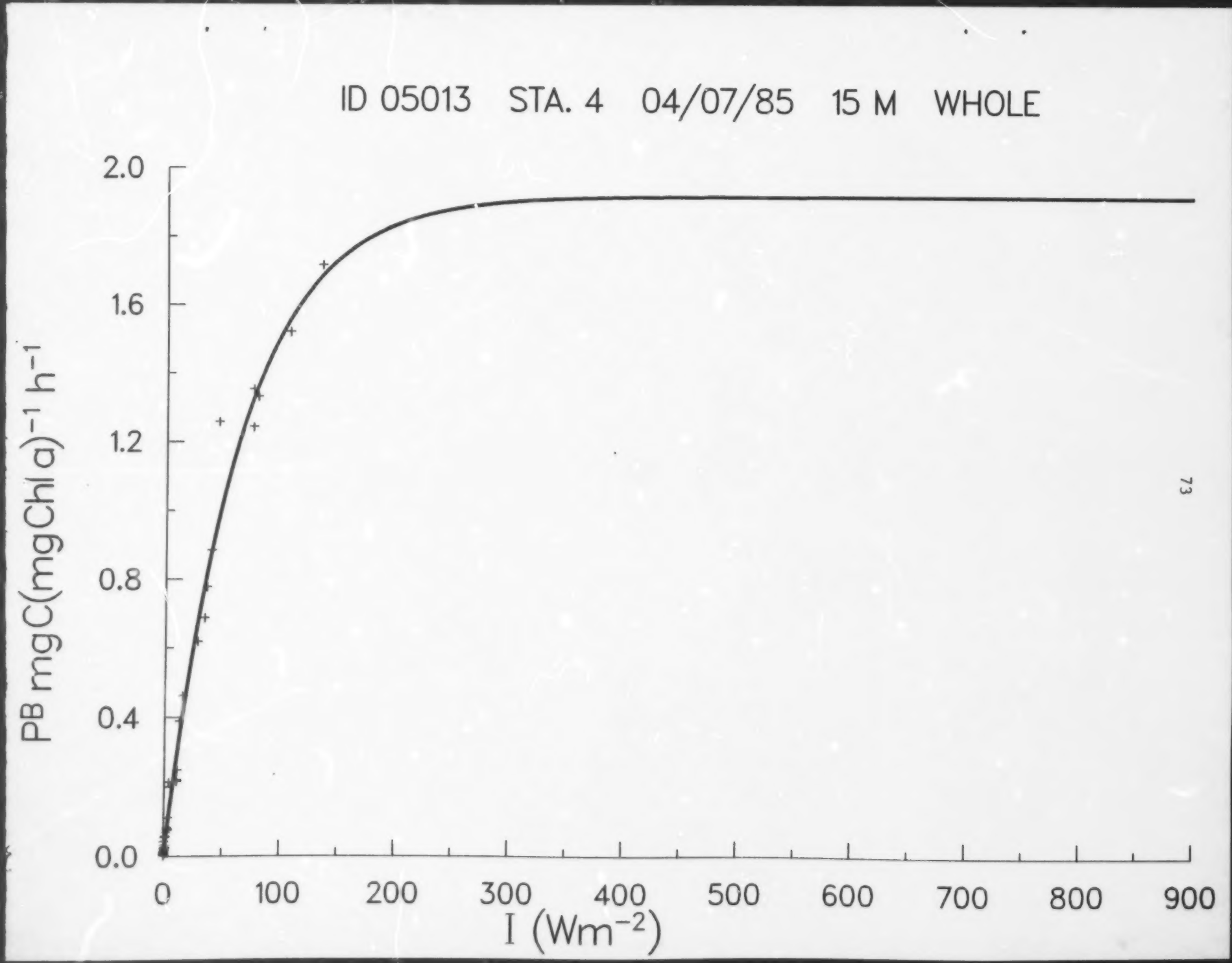

ID 05008 STA. 2 03/07/85 25 M < 1 MICR
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
89

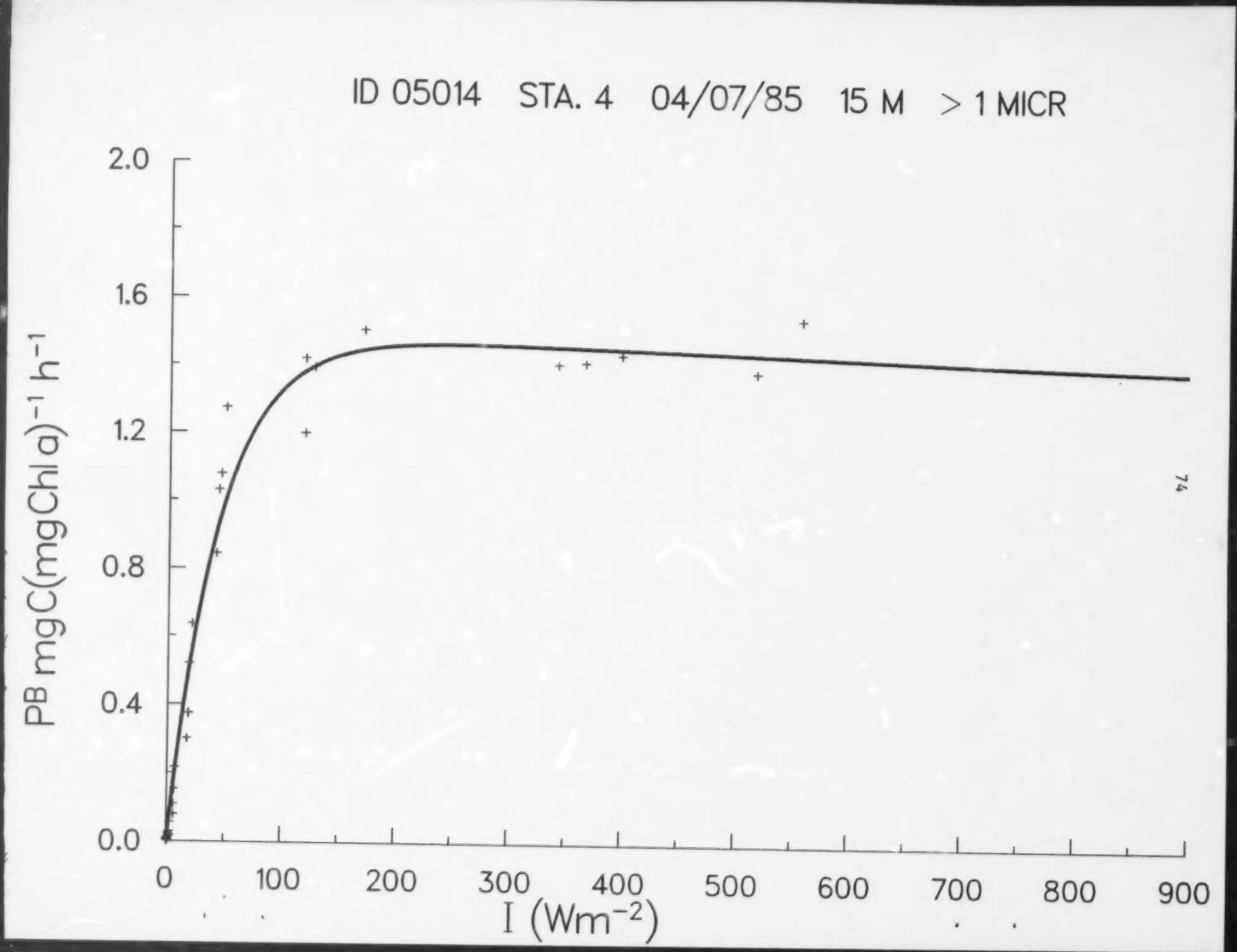

ID 05009 STA. 2 03/07/85 1 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
2.5
2.0
1.5
1.0
0.5
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
69

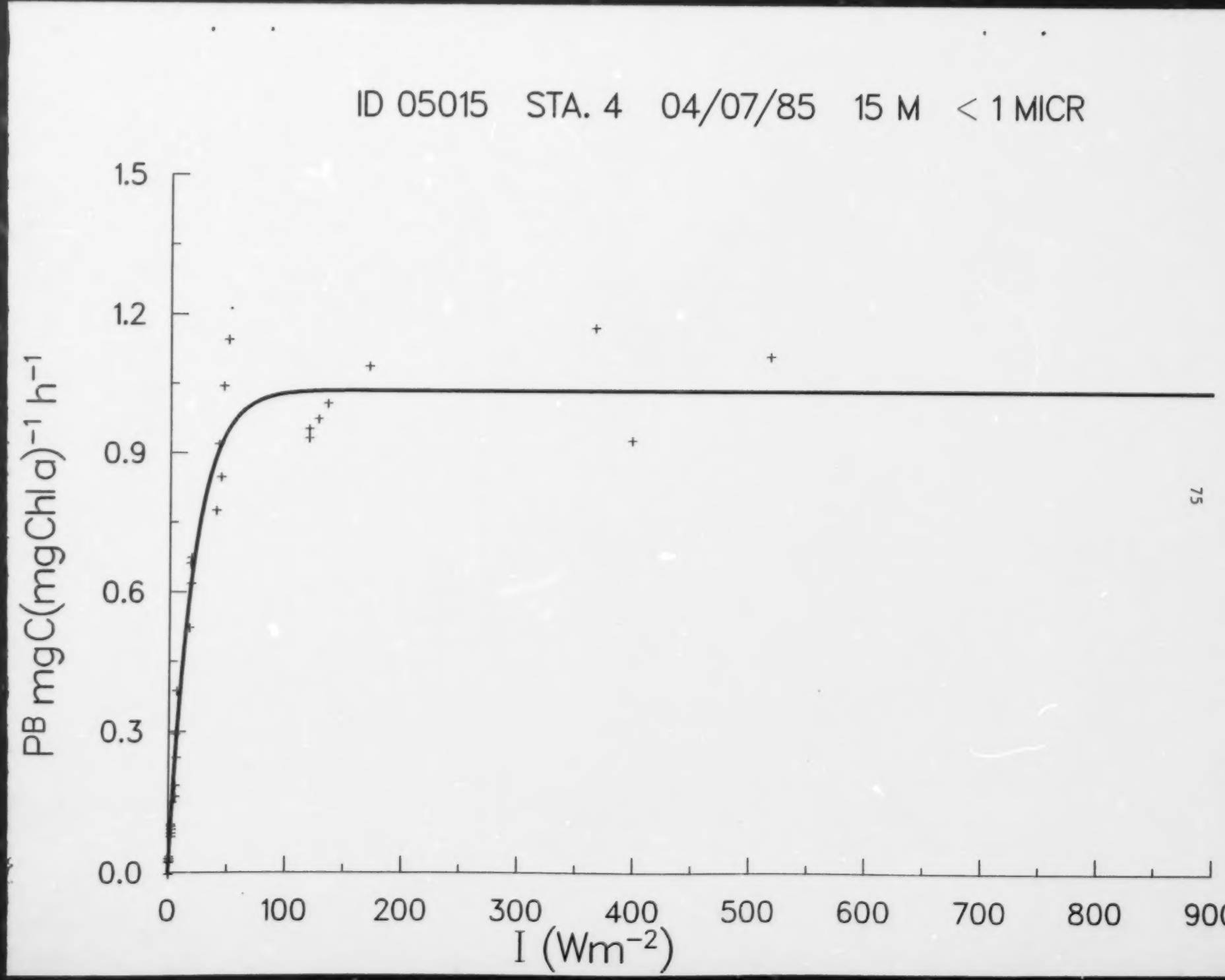

ID 05010 STA. 3 03/07/85 35 M WHOLE
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
70

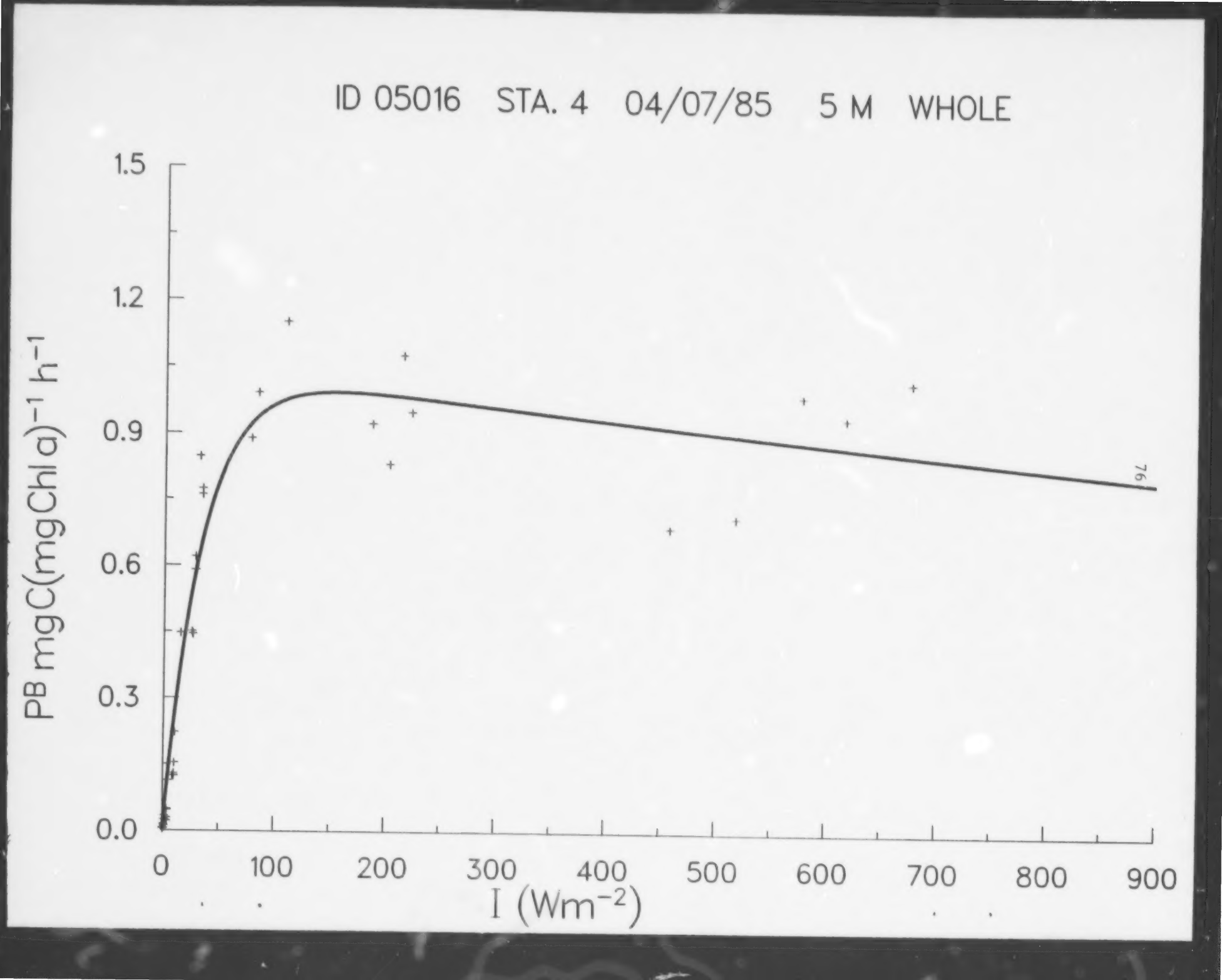

ID 05011 STA. 3 03/07/85 35 M > 1 MICR
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

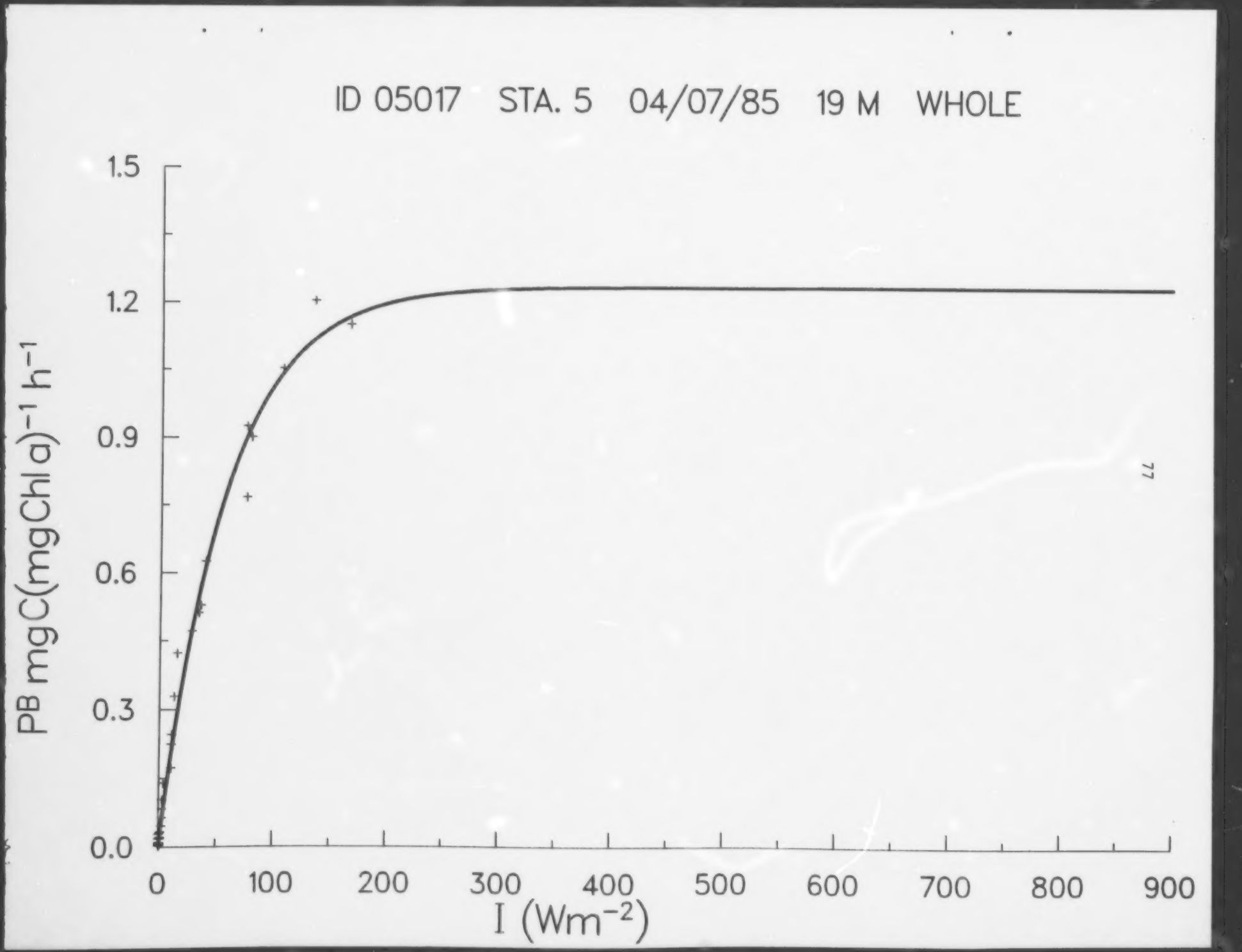

ID 05012 STA. 3 03/07/85 35 M < 1 MICR
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

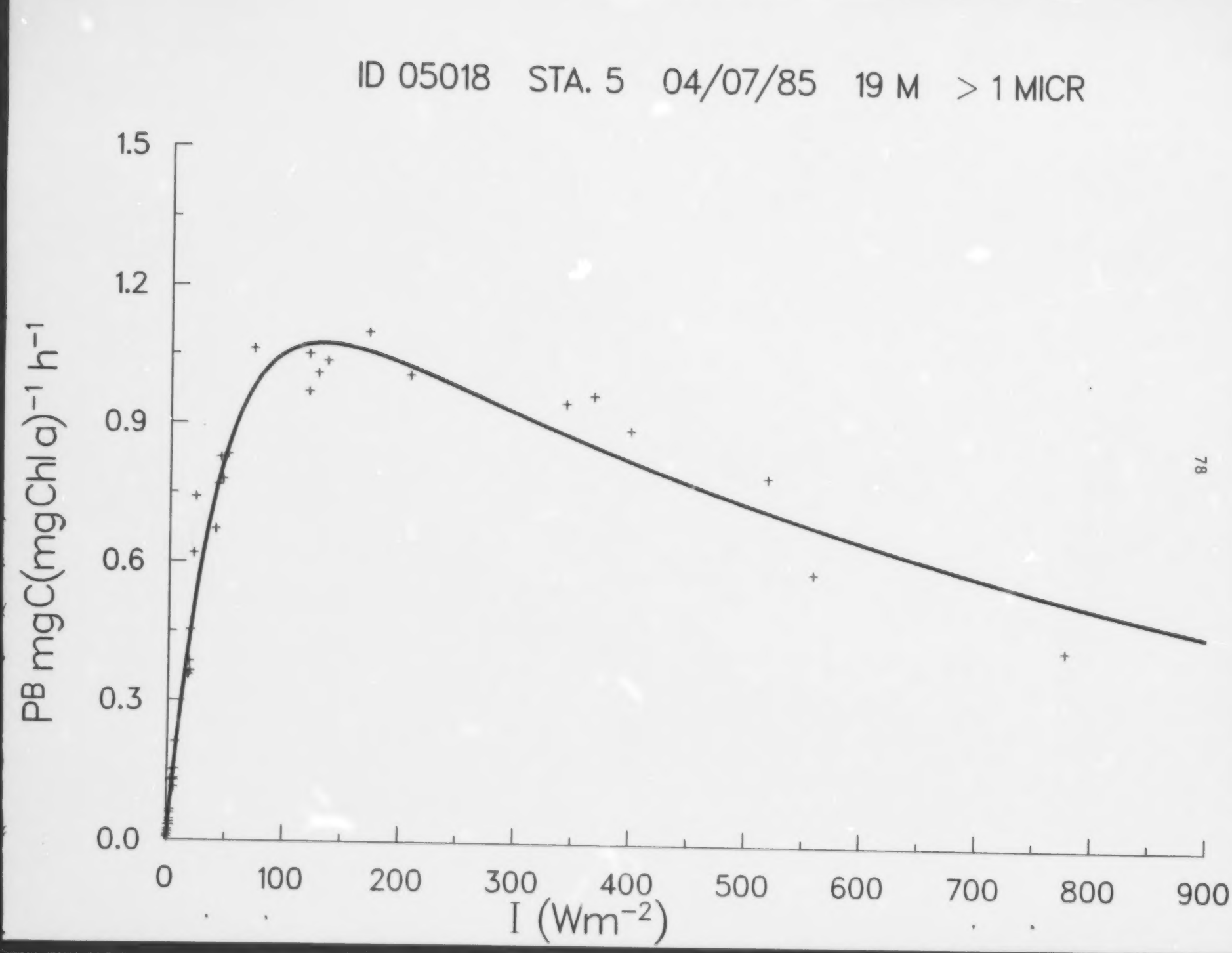

ID 05013 STA. 4 04/07/85 15 M WHOLE
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

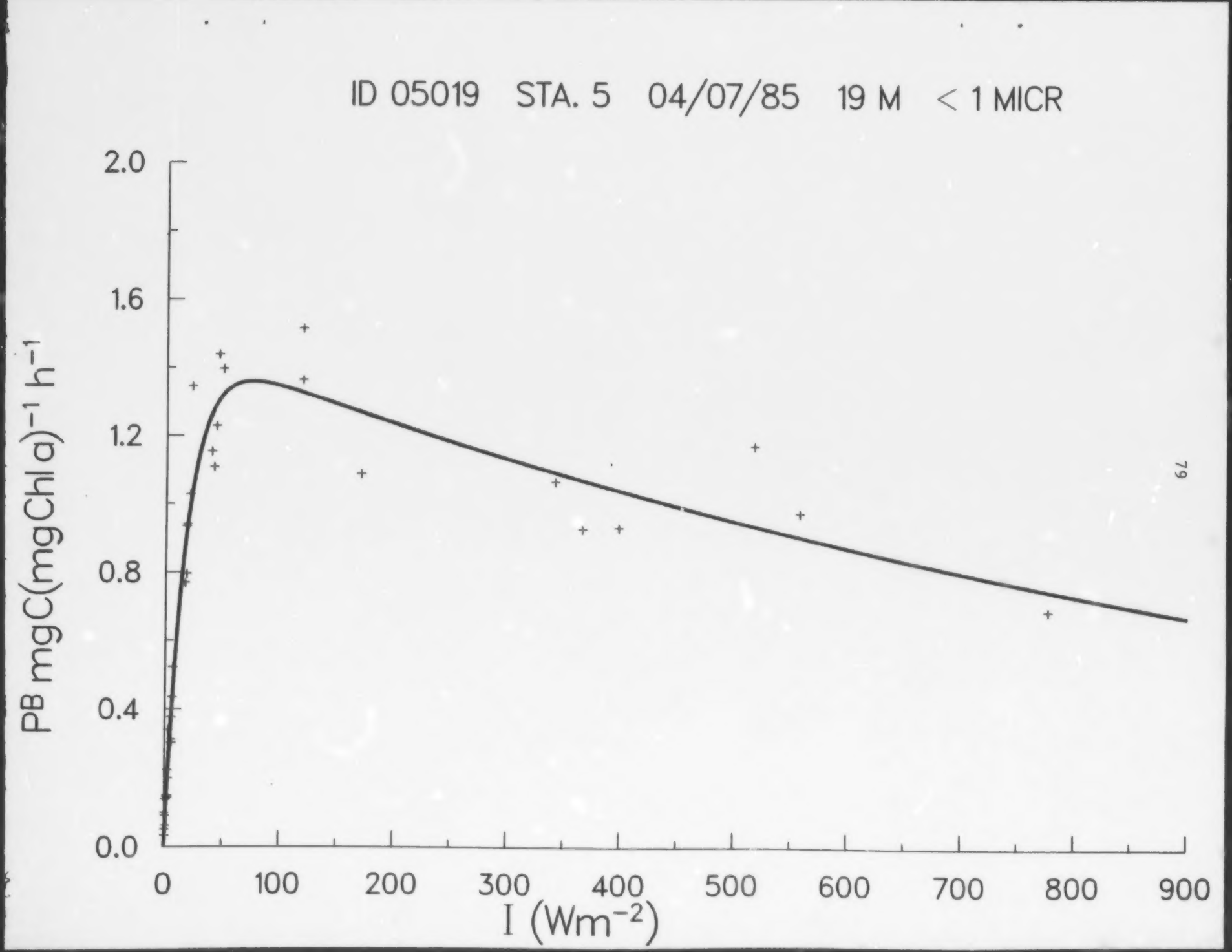

ID 05014 STA. 4 04/07/85 15 M > 1 MICR
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
74

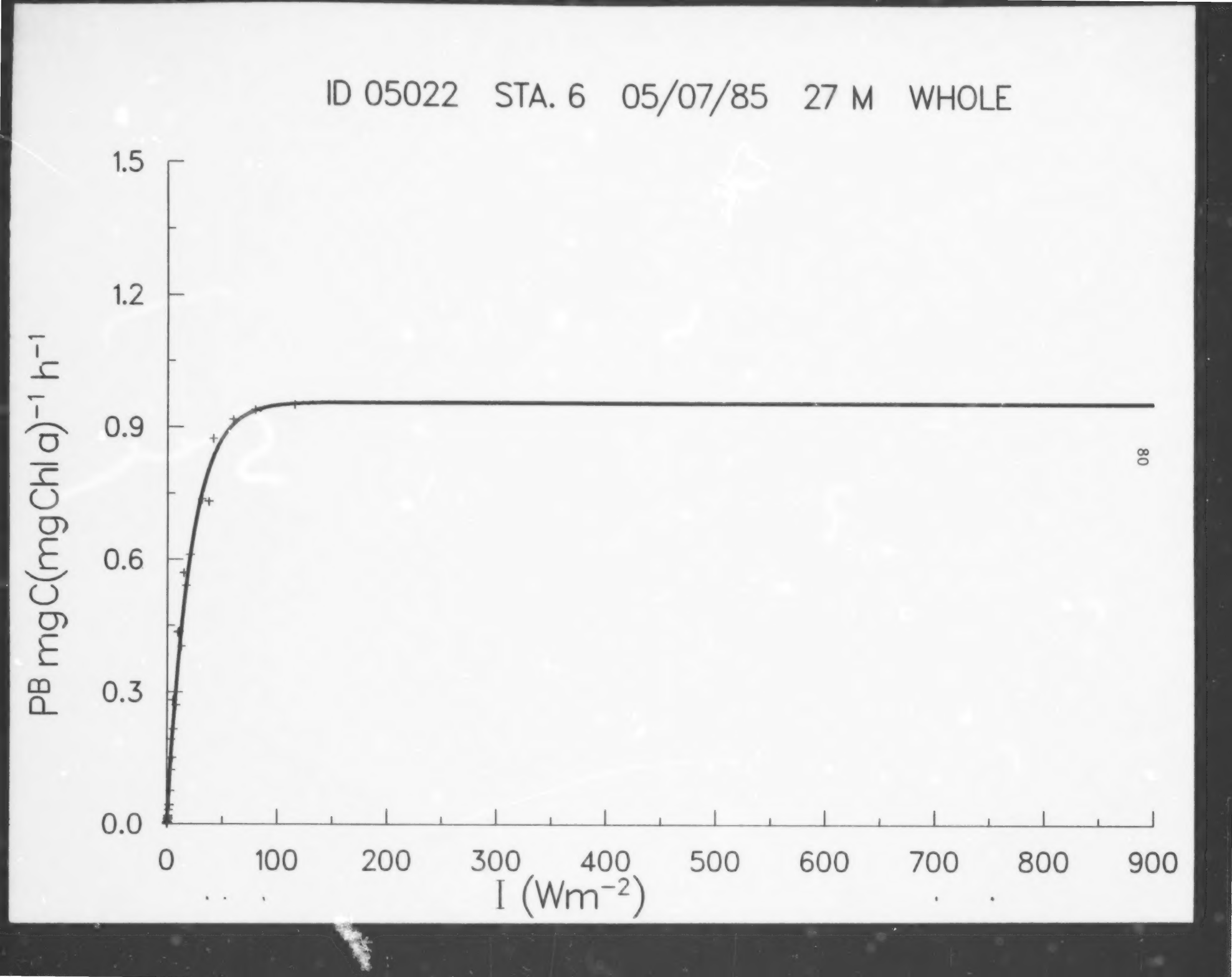

ID 05015 STA. 4 04/07/85 15 M < 1 MICR
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

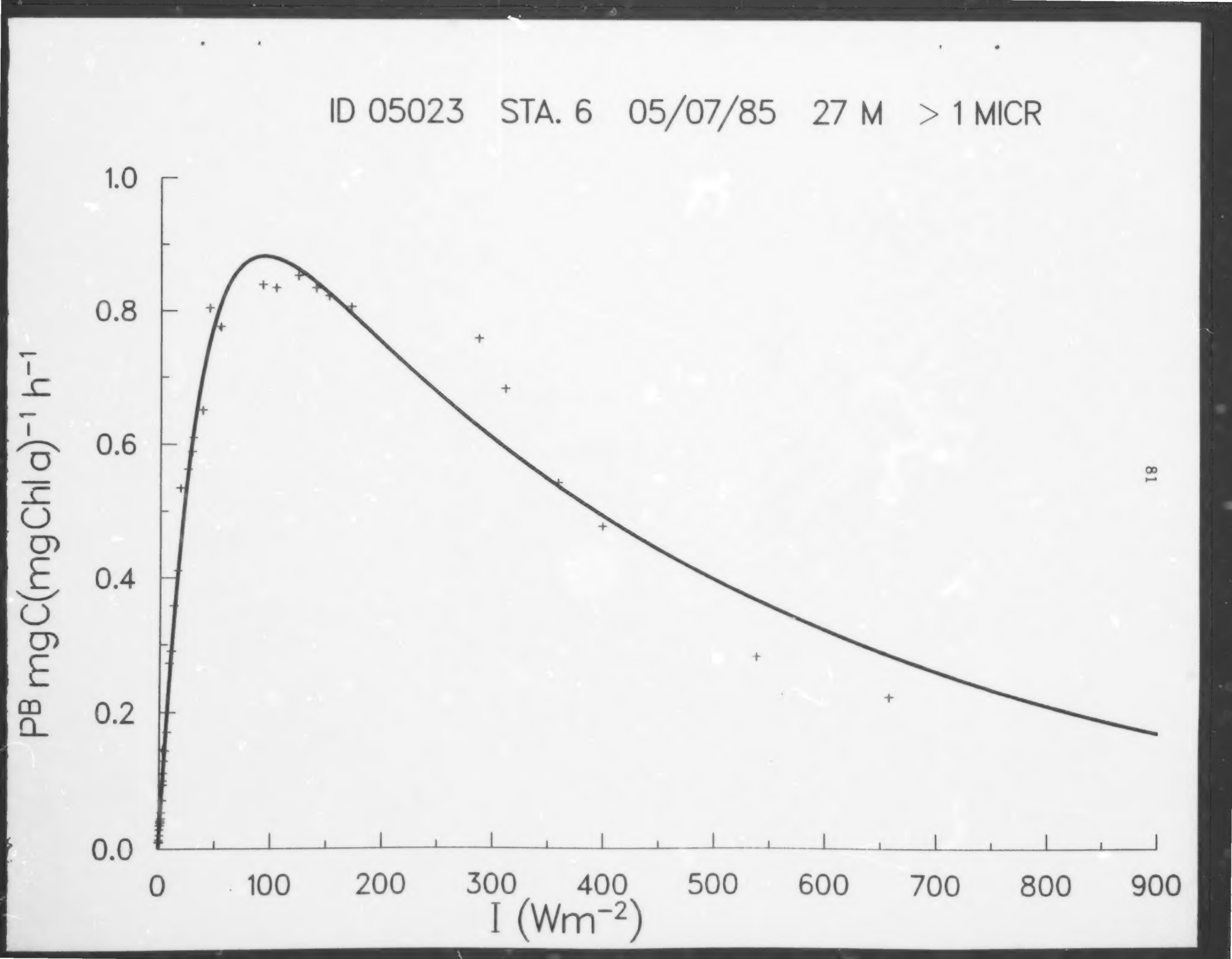

ID 05016 STA. 4 04/07/85 5 M WHOLE
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
76

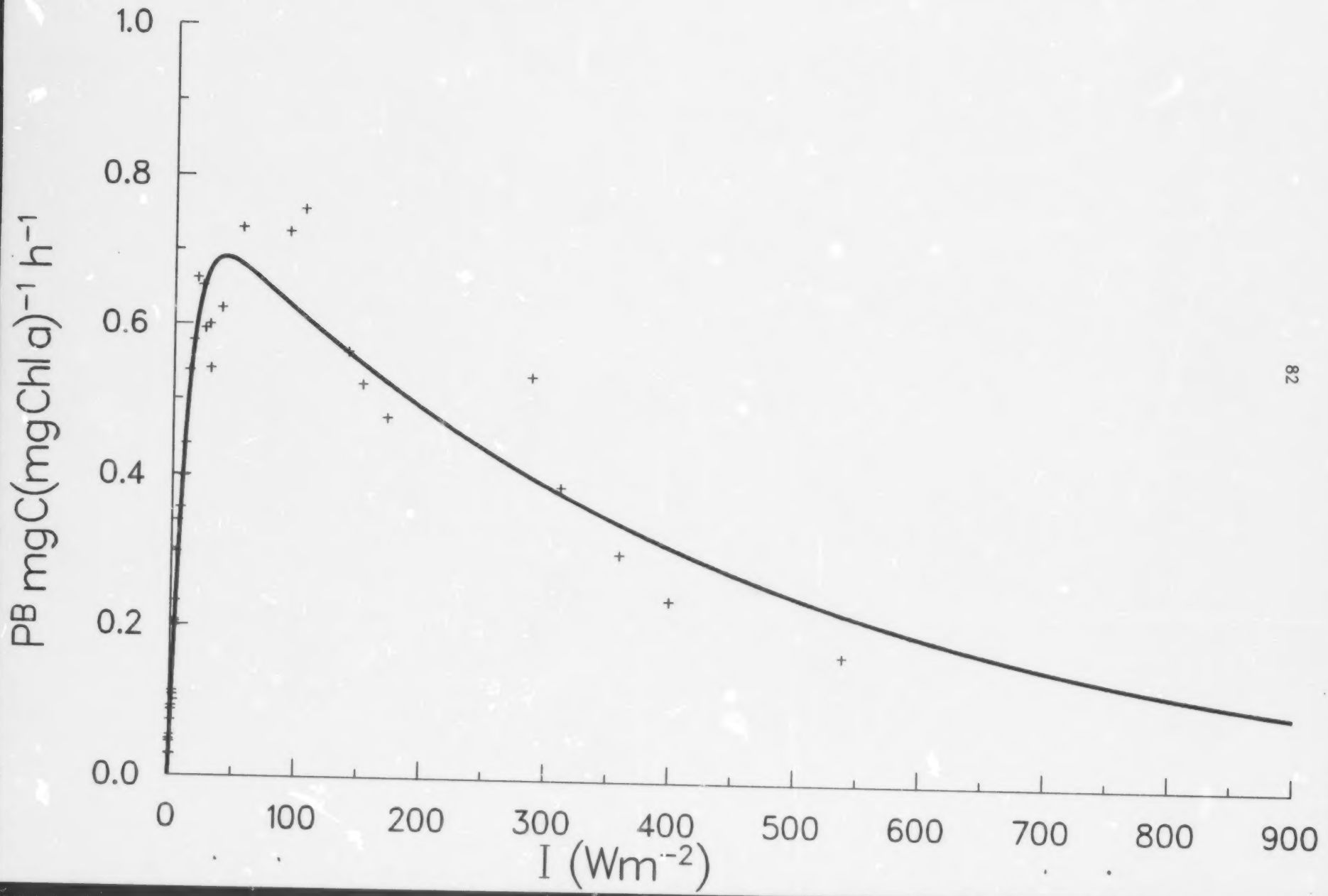

ID 05017 STA. 5 04/07/85 19 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

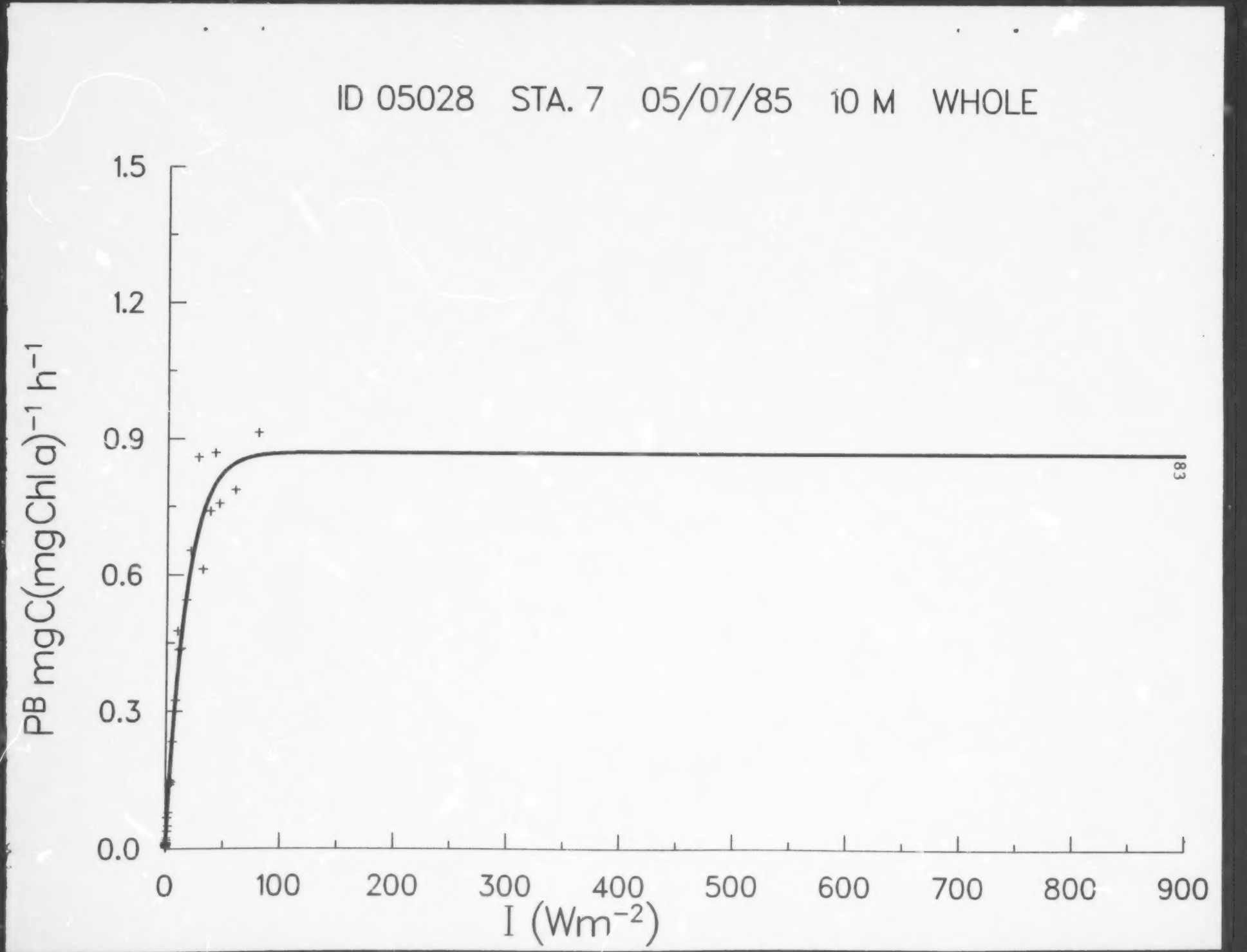

ID 05018 STA. 5 04/07/85 19 M > 1 MICR
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
78

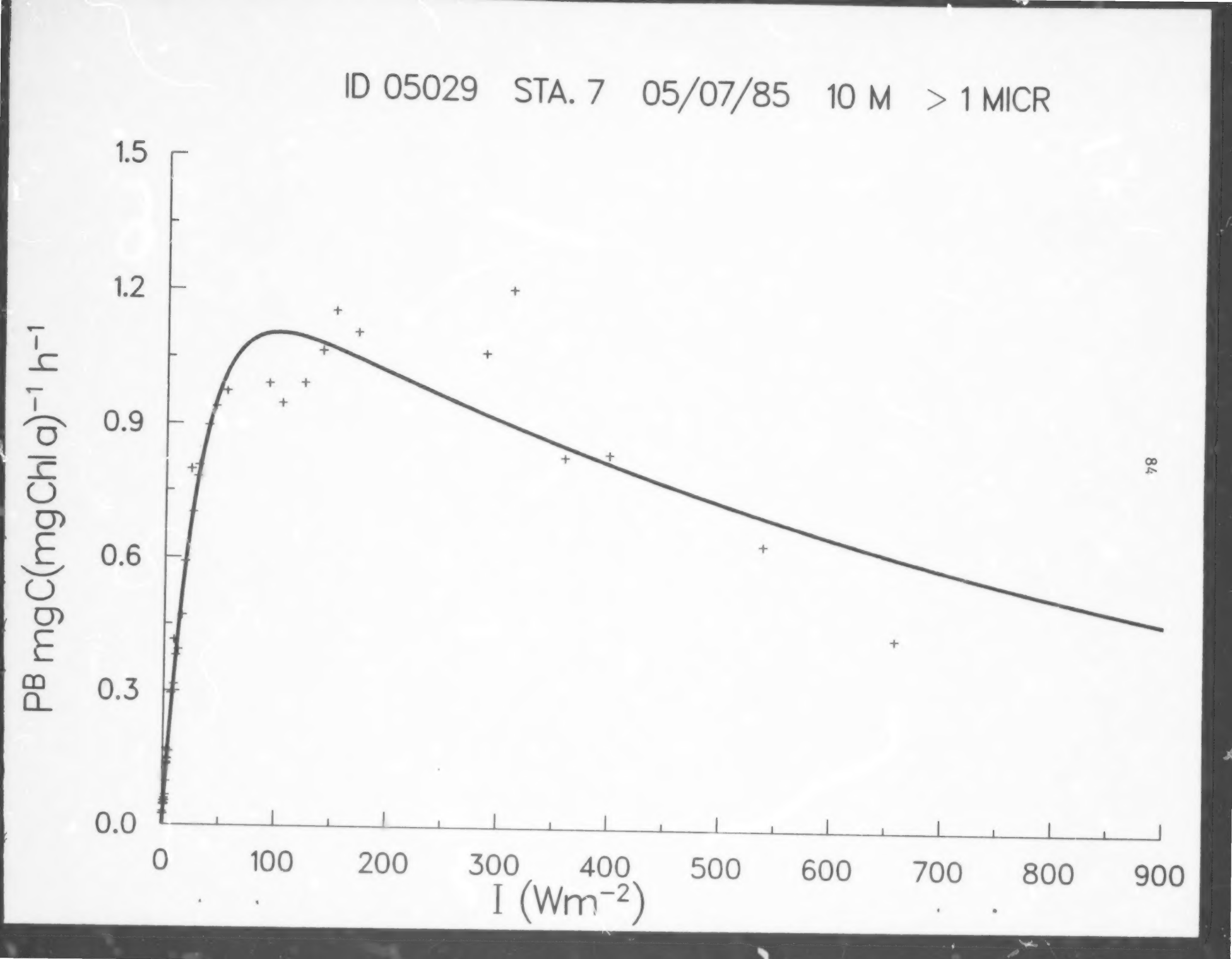

ID 05019 STA. 5 04/07/85 19 M < 1 MICR
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
79

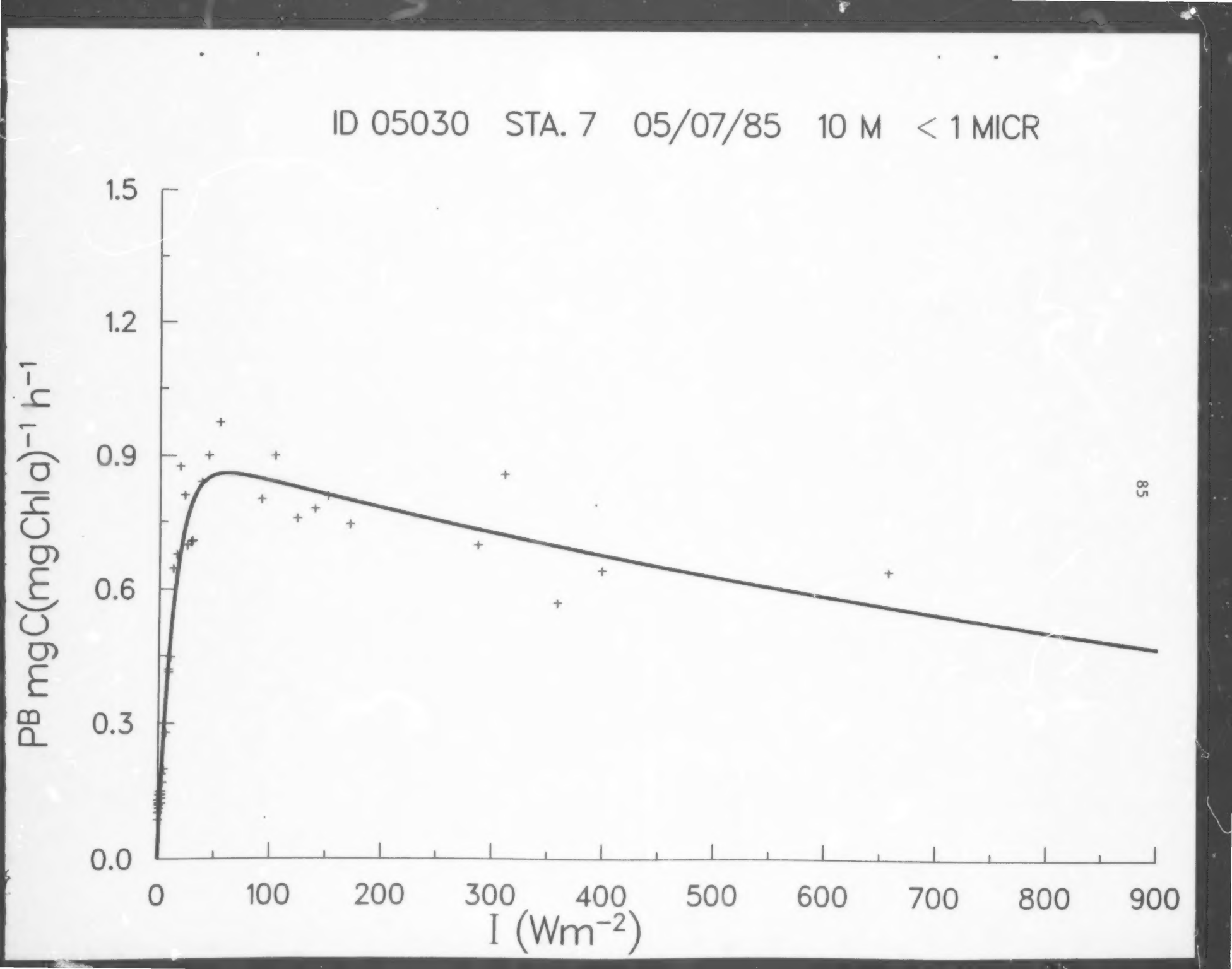

ID 05022 STA. 6 05/07/85 27 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
80

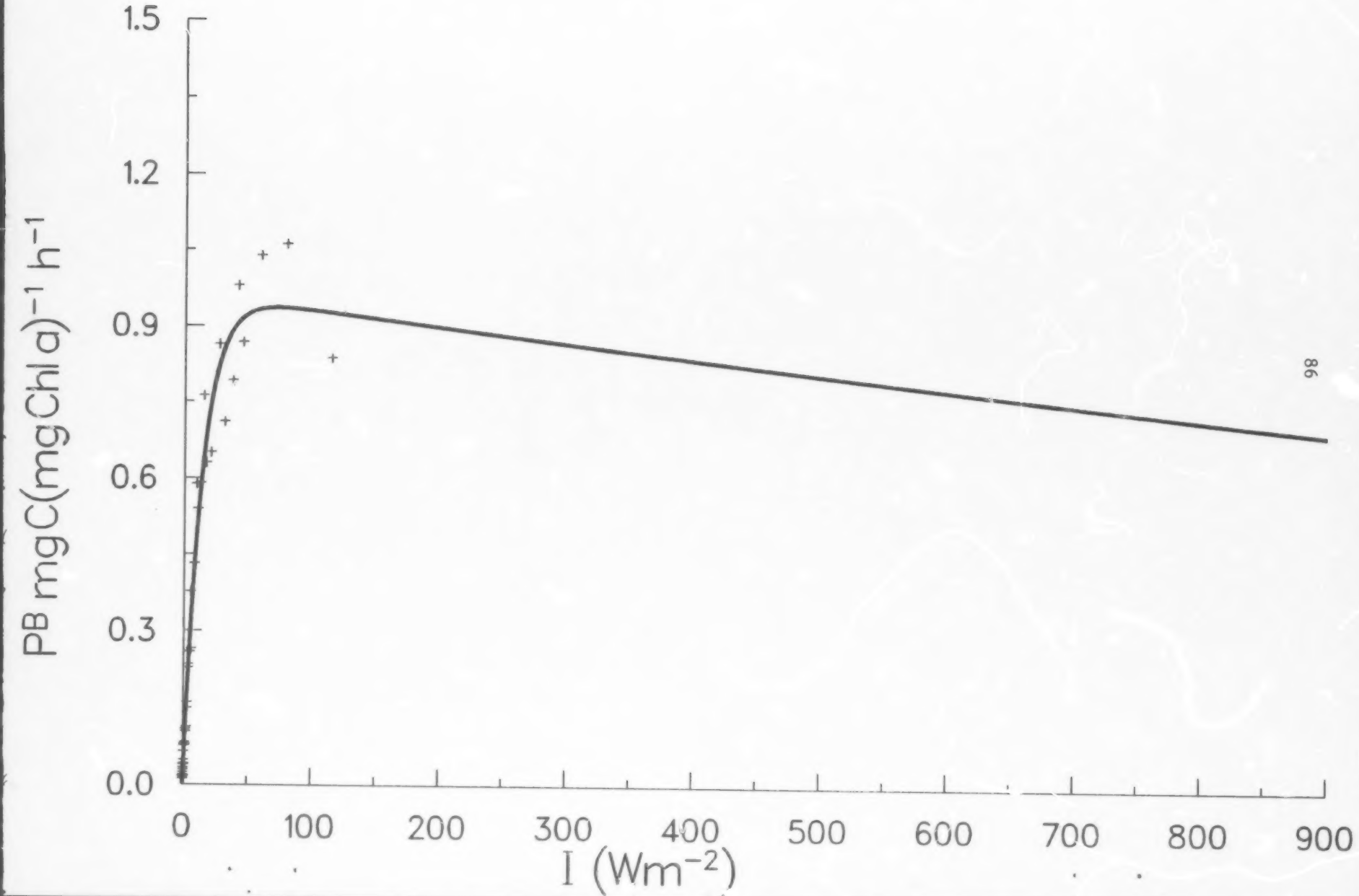

ID 05023 STA. 6 05/07/85 27 M > 1 MICR
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
81

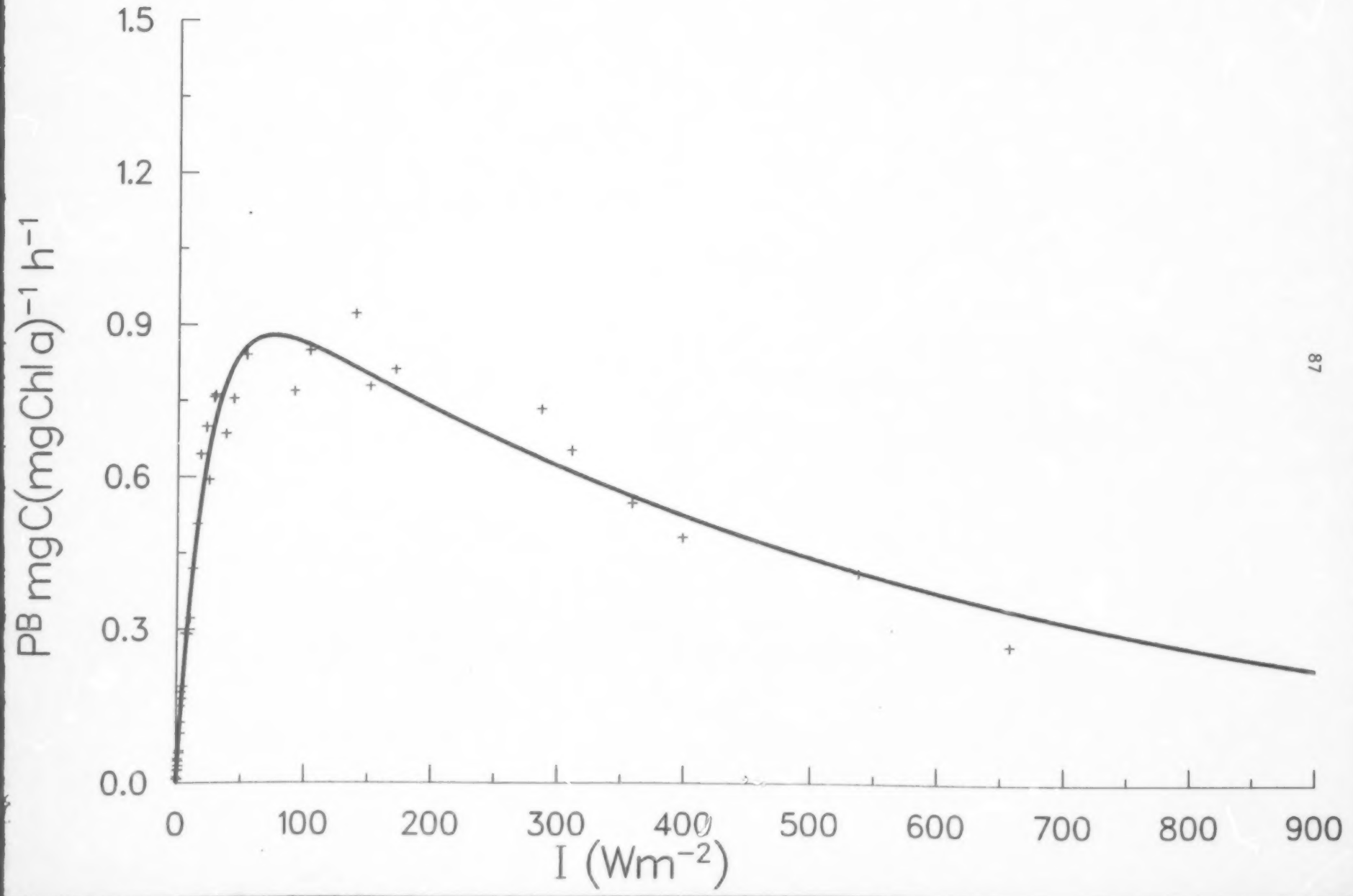

ID 05024 STA. 6 05/07/85 27 M < 1 MICR
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
82

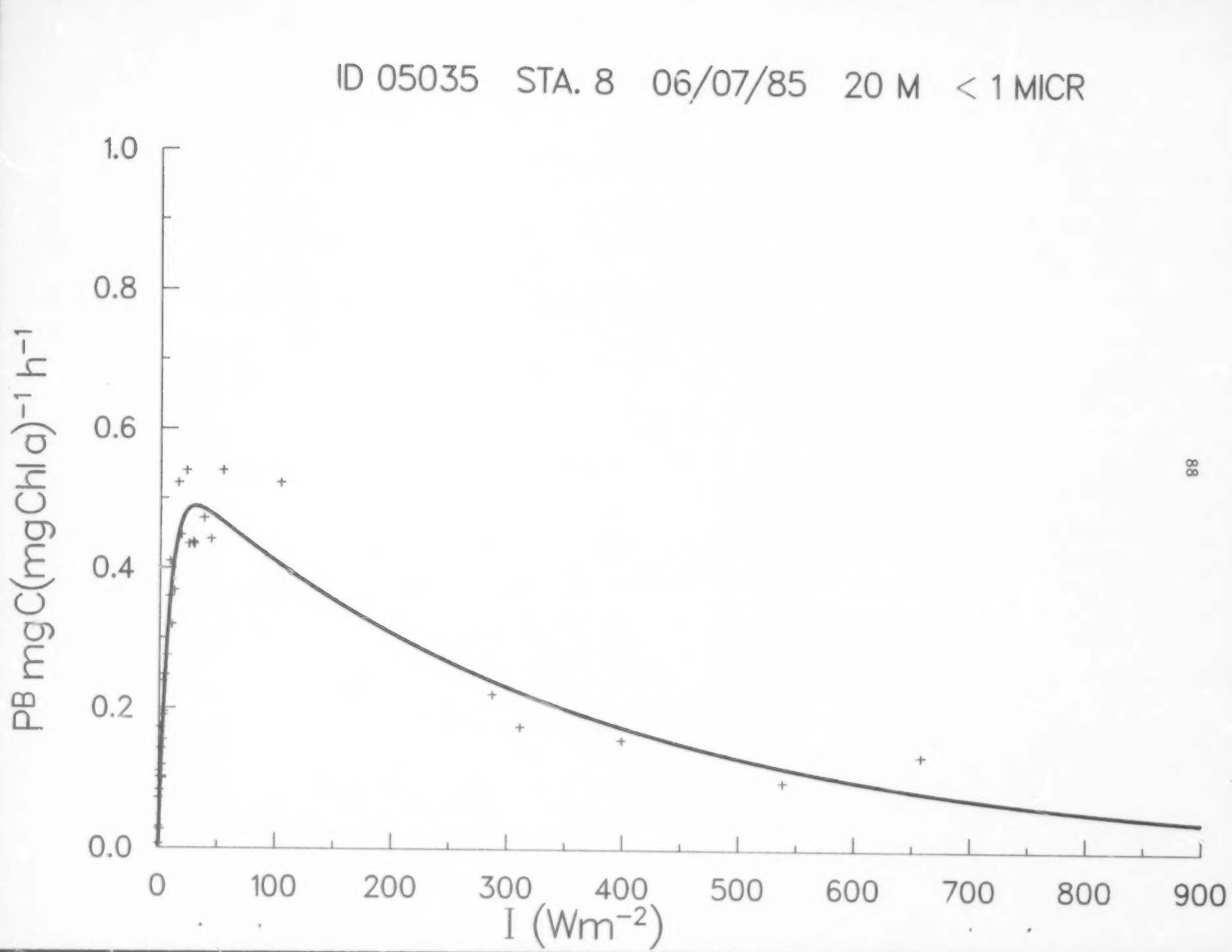

ID 05028 STA. 7 05/07/85 10 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
83

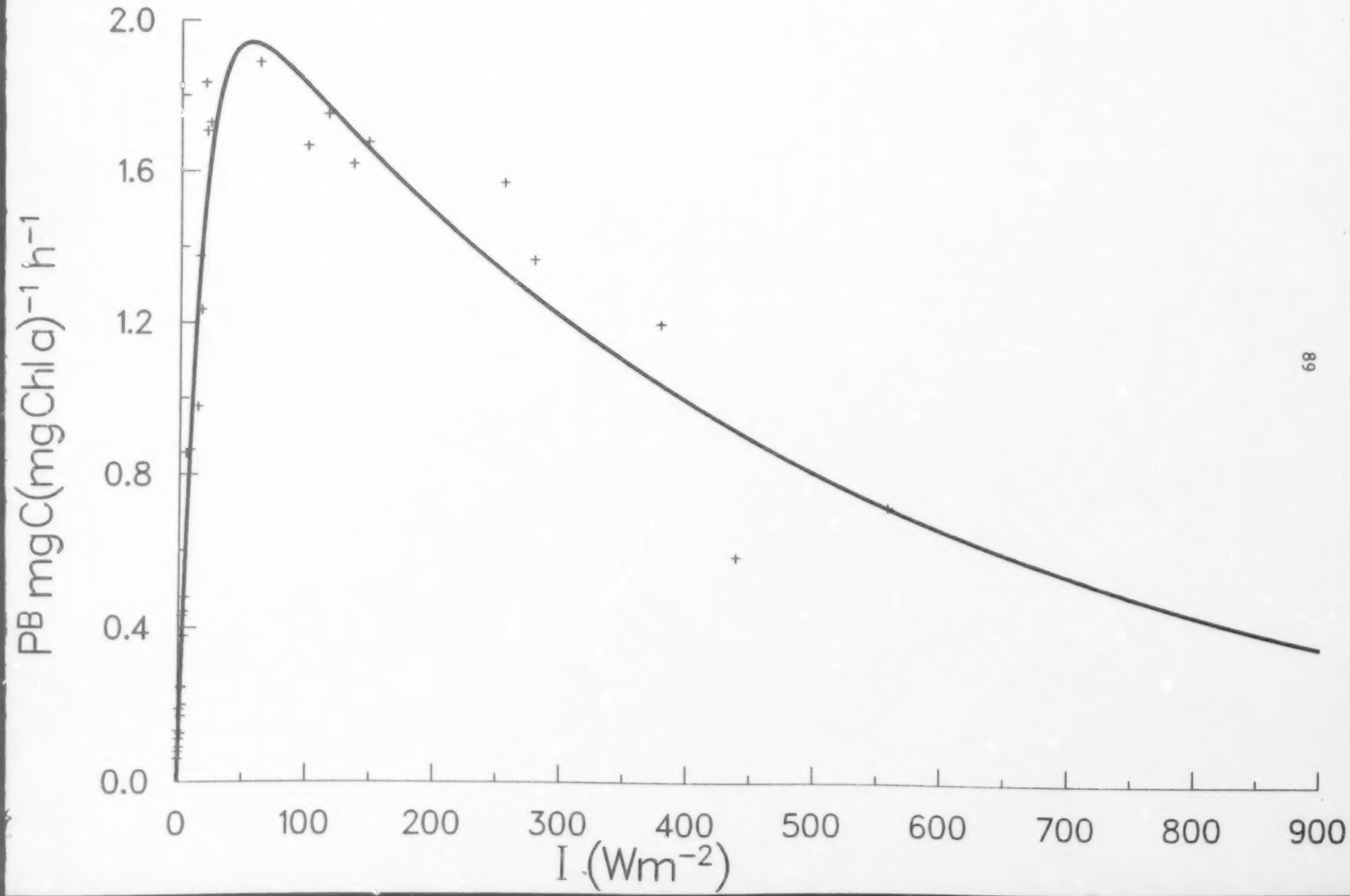

ID 05029 STA. 7 05/07/85 10 M > 1 MICR
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
84

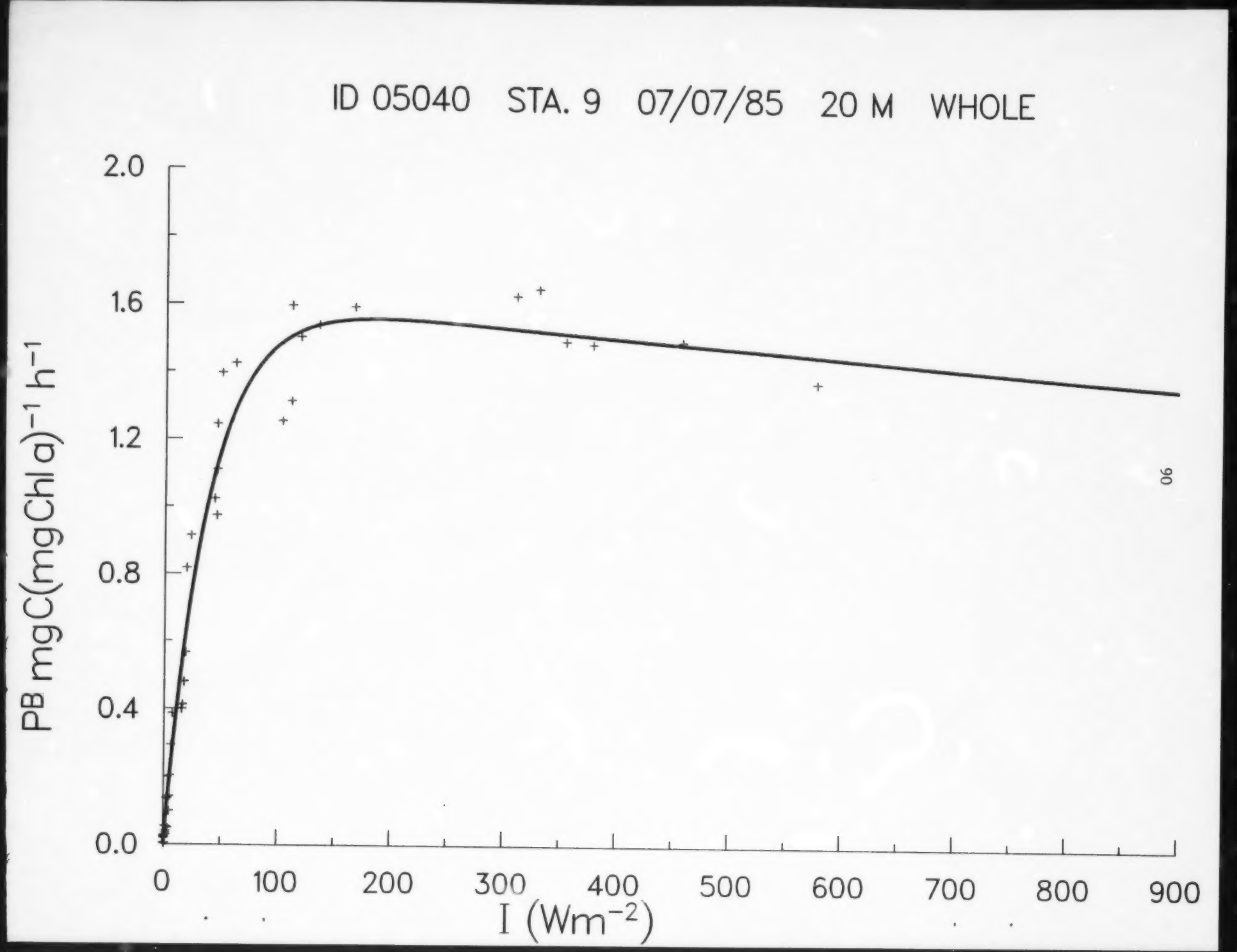

ID 05030 STA. 7 05/07/85 10 M < 1 MICR
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
85

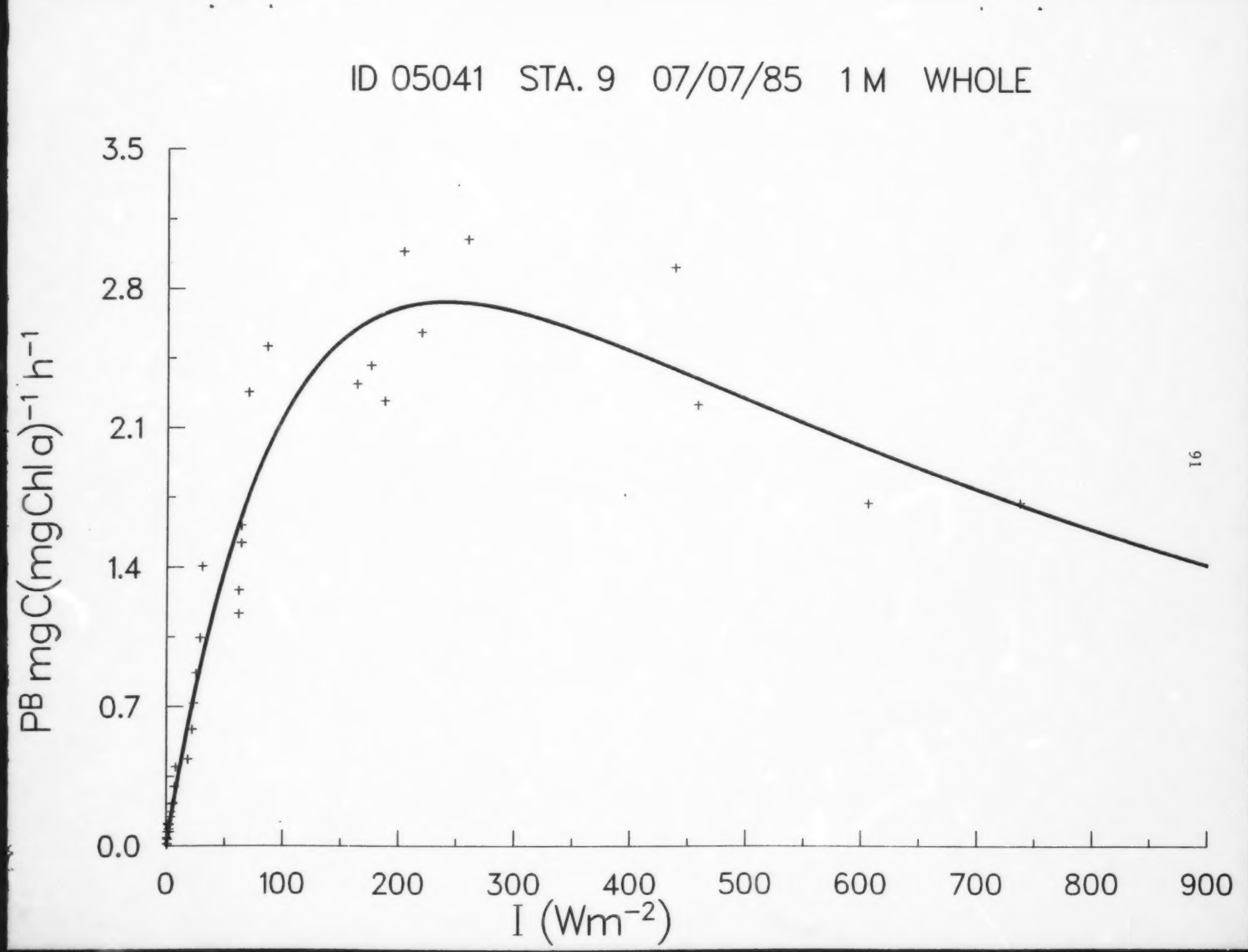

ID 05033 STA. 8 06/07/85 20 M WHOLE
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
86

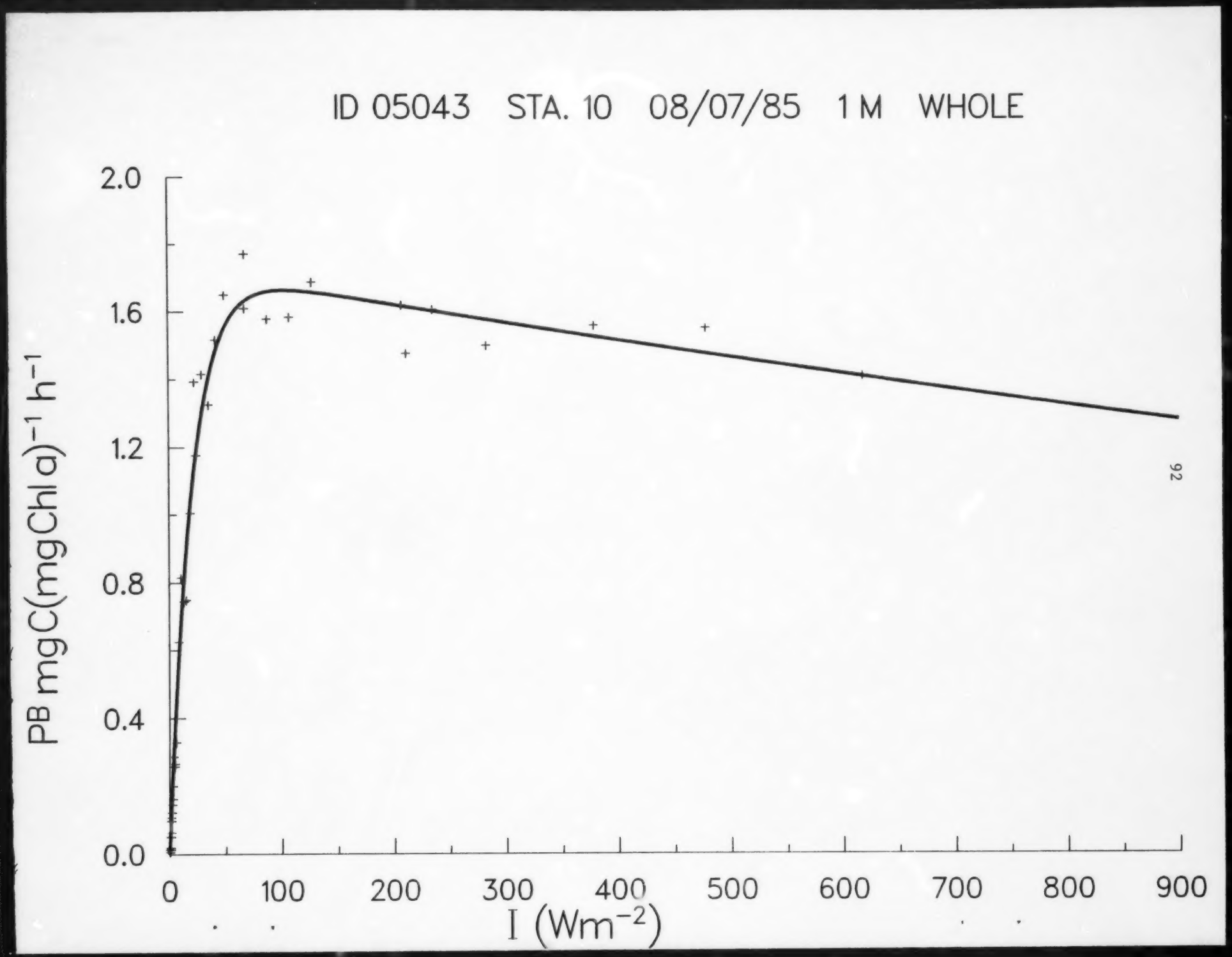

ID 05034 STA. 8 06/07/85 20 M > 1 MICR
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
87

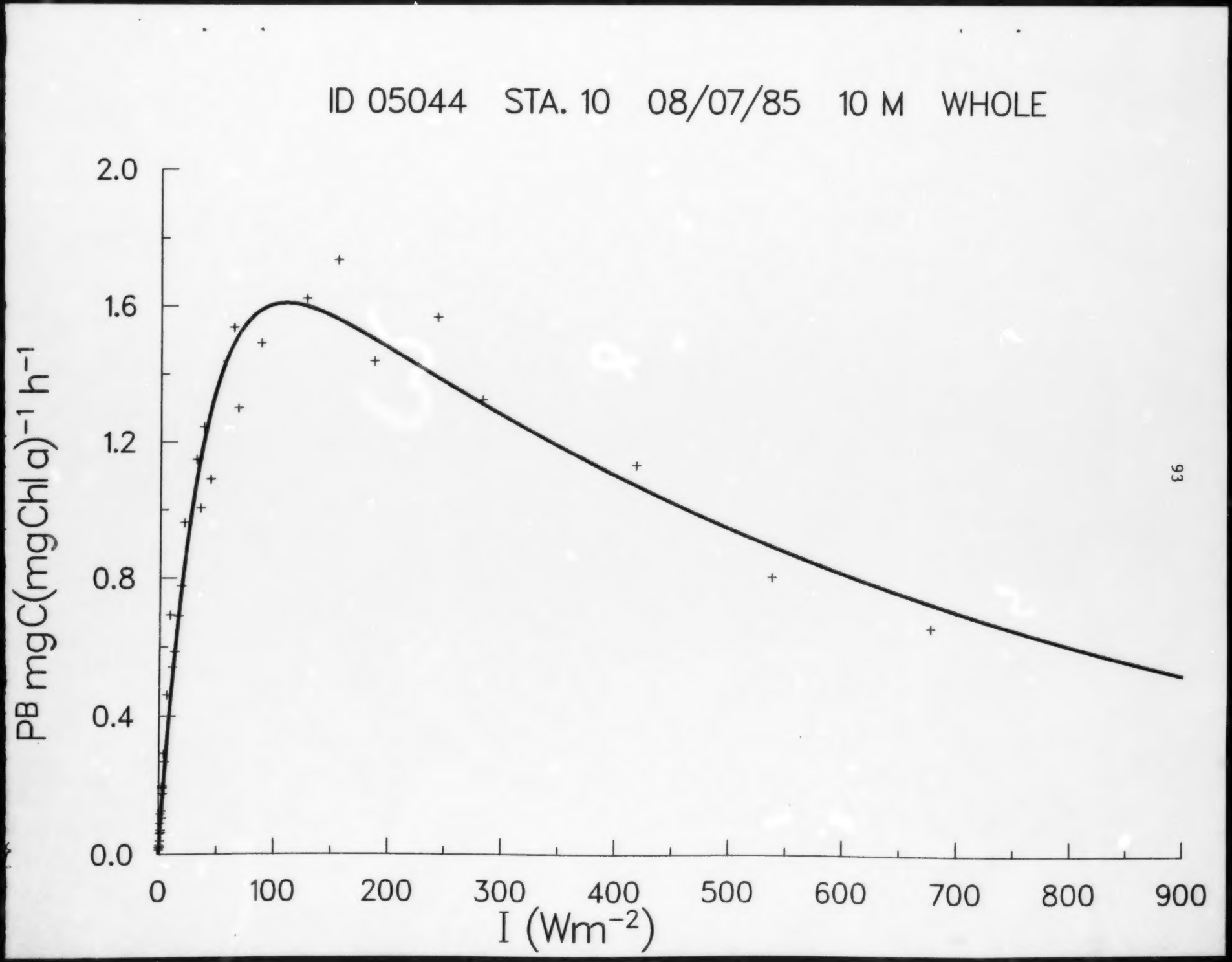

ID 05035 STA. 8 06/07/85 20 M < 1 MICR
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)⁻¹ h⁻¹
0
100
200
300
400
500
600
700
800
900
I (Wm⁻²)

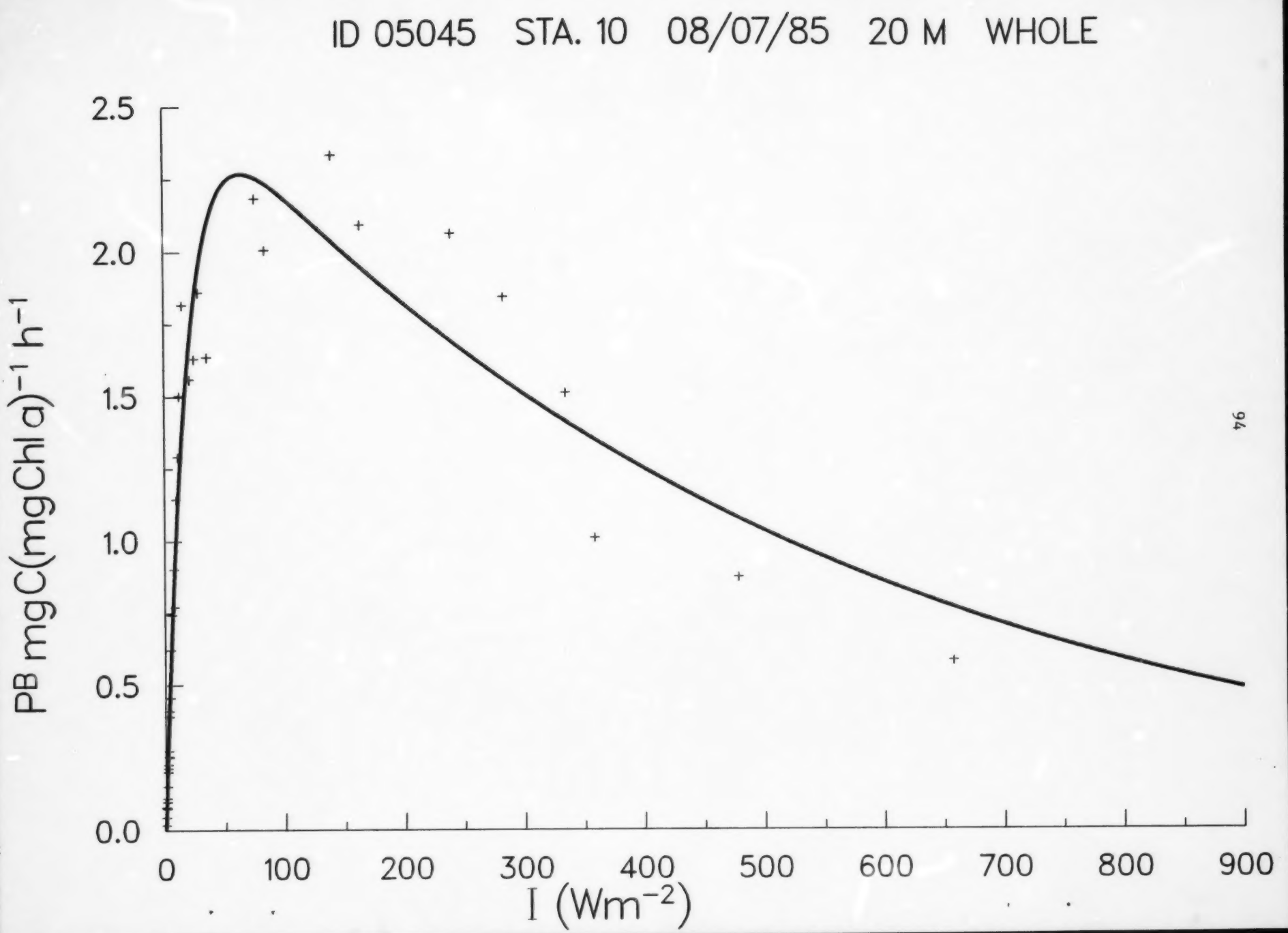

ID 05039 STA. 9 07/07/85 40 M WHOLE
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
68

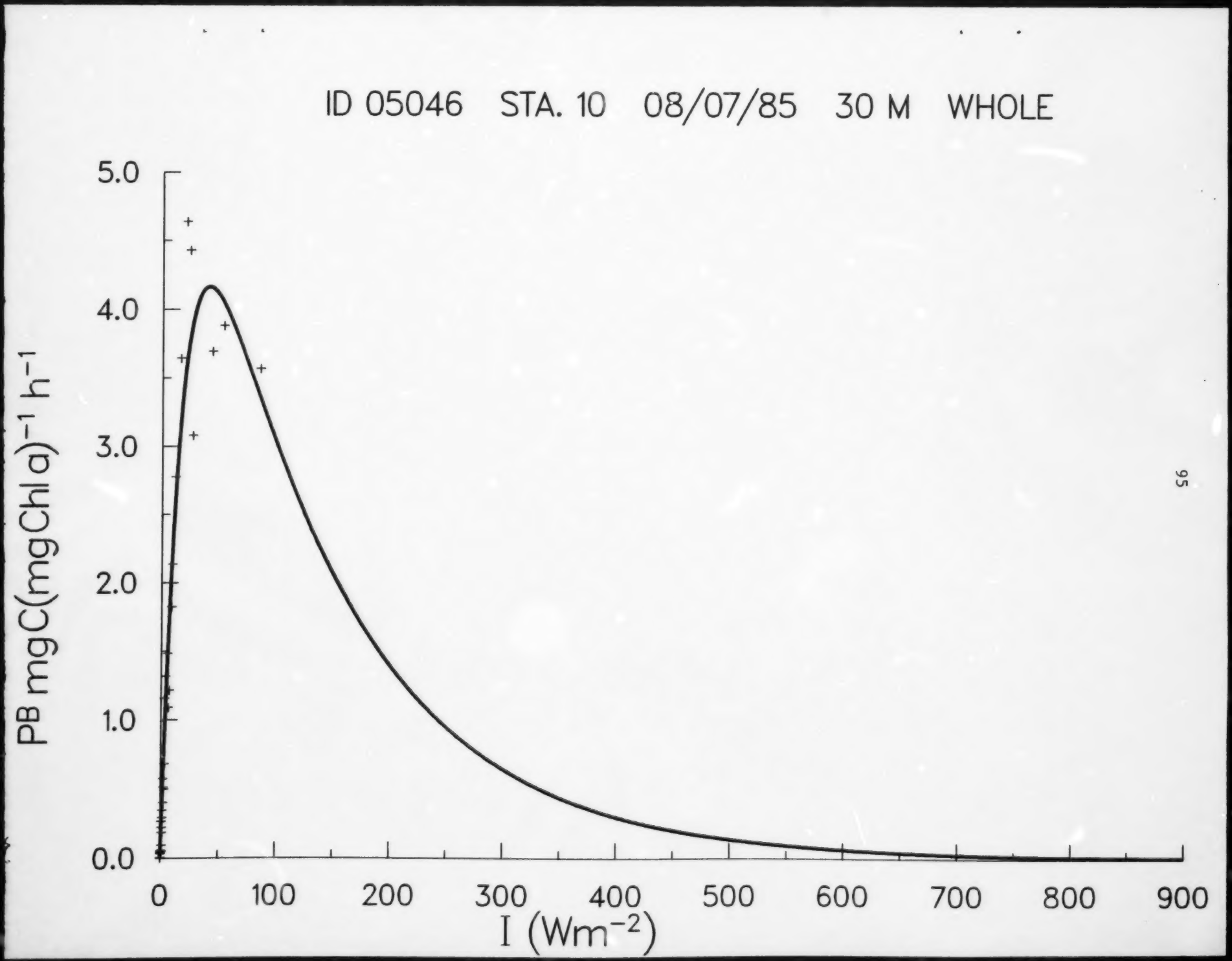

ID 05040 STA. 9 07/07/85 20 M WHOLE
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
90

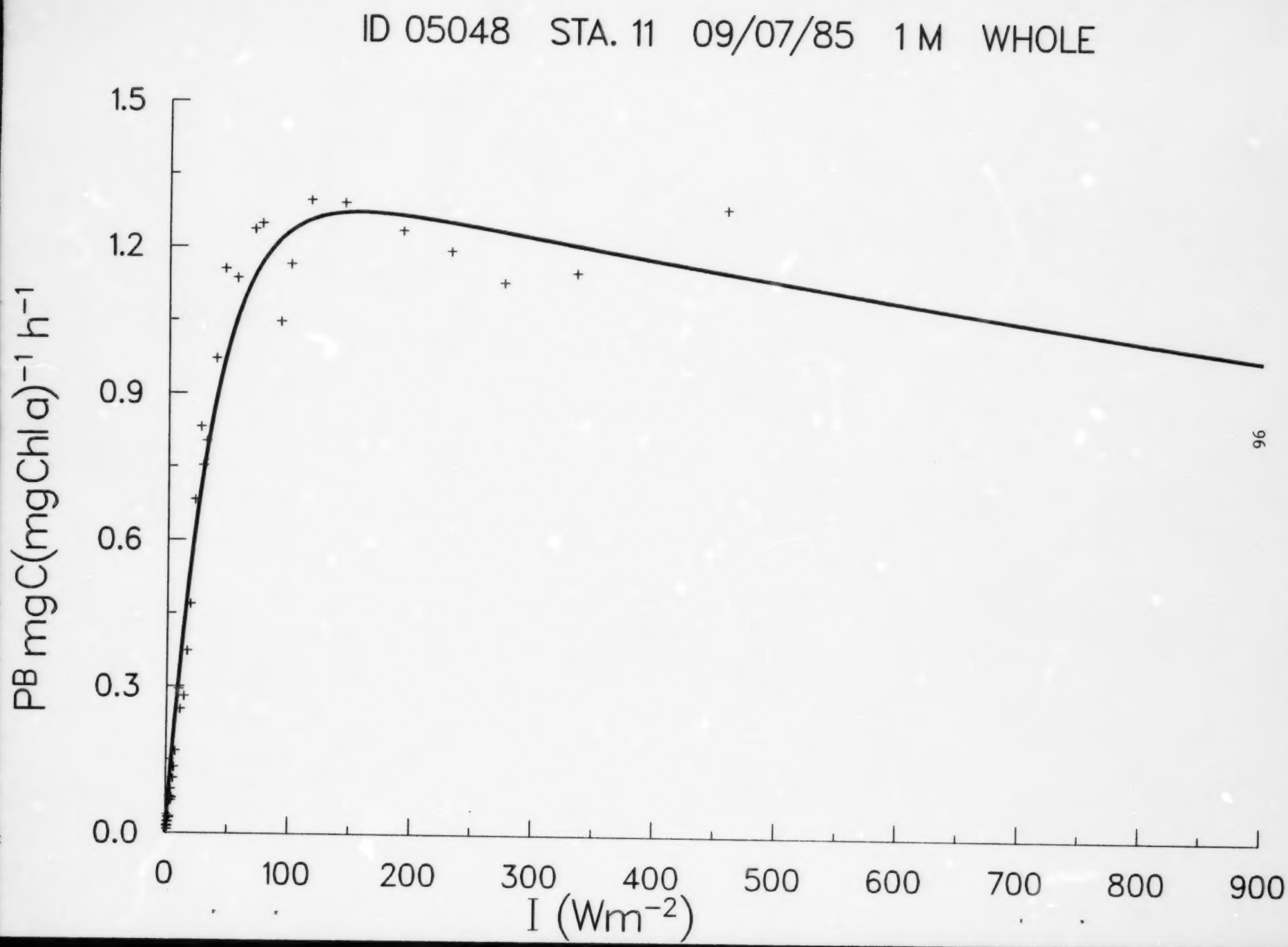

ID 05041 STA. 9 07/07/85 1 M WHOLE
3.5
2.8
2.1
1.4
0.7
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
16

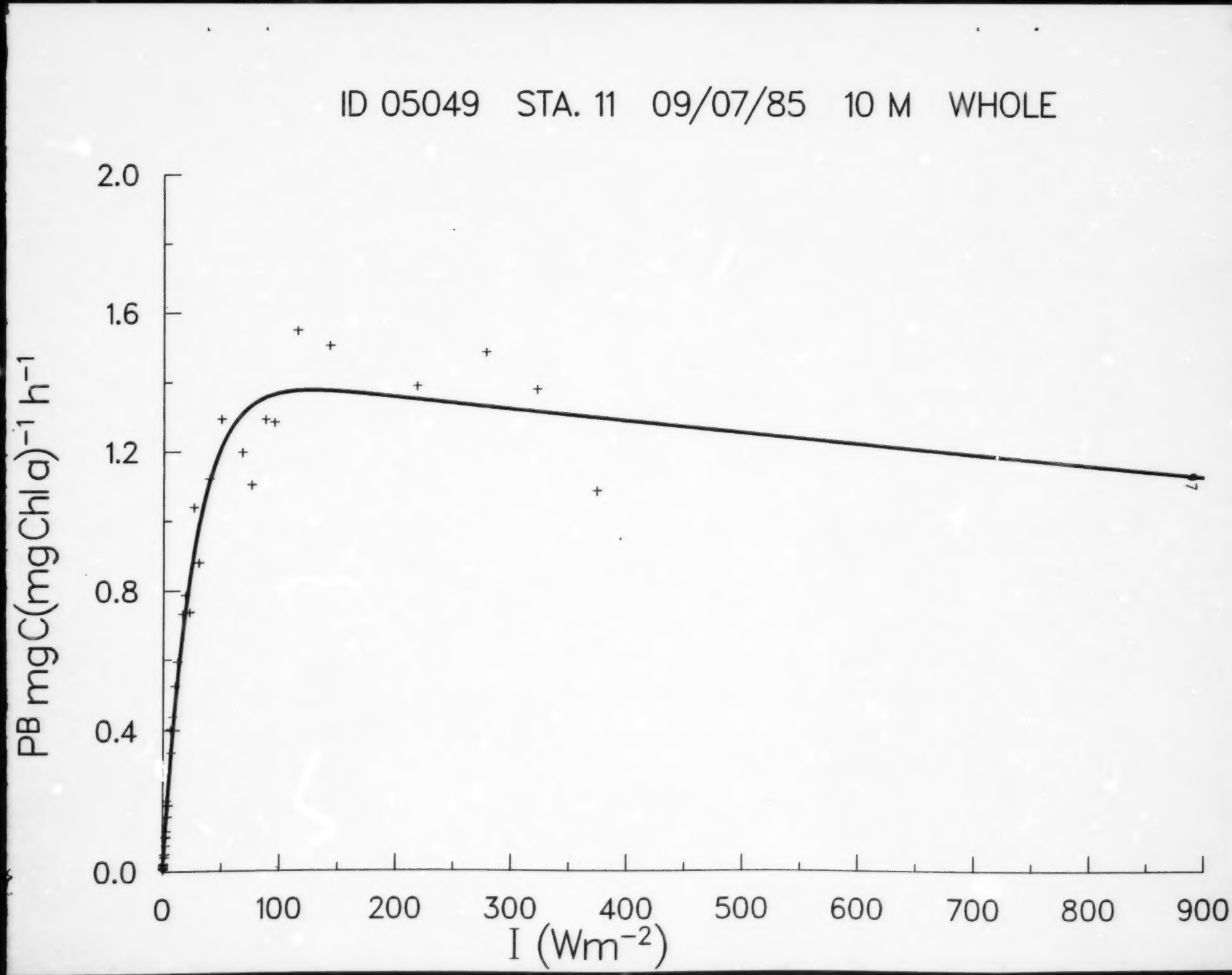

ID 05043 STA. 10 08/07/85 1 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
2.0
1.6
1.2
0.8
0.4
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
92

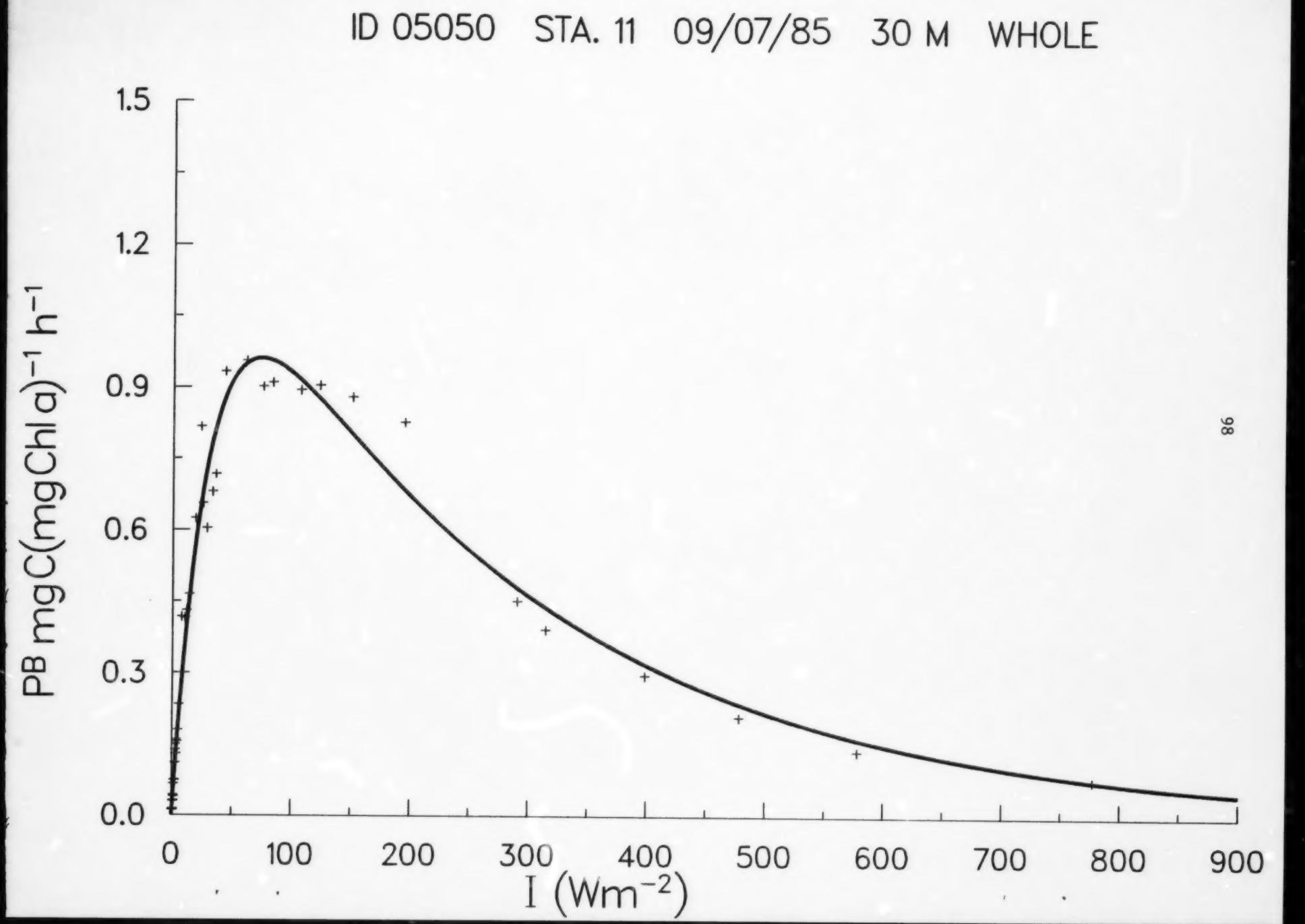

ID 05044 STA. 10 08/07/85 10 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
2.0
1.6
1.2
0.8
0.4
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
93

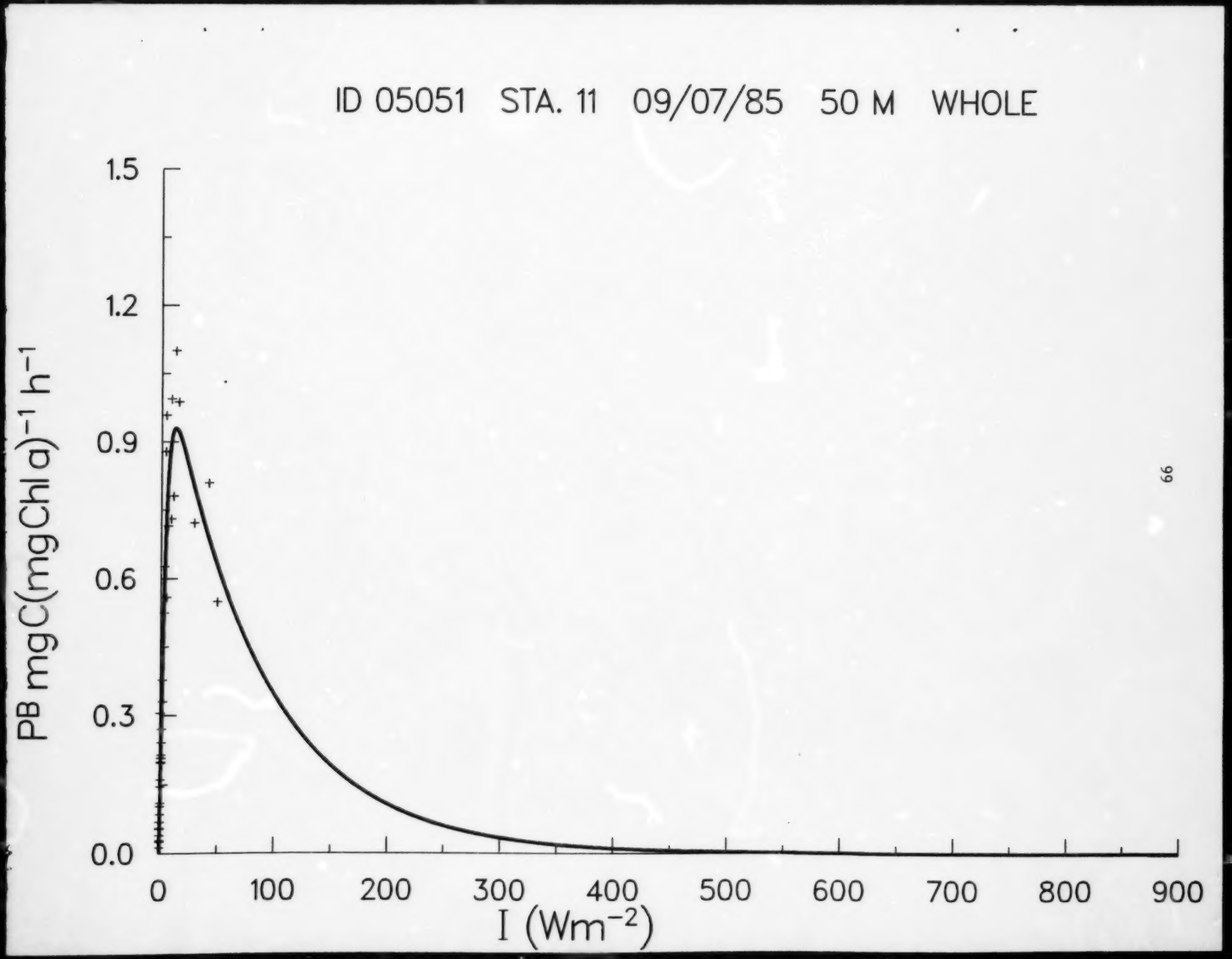

ID 05045 STA. 10 08/07/85 20 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
2.5
2.0
1.5
1.0
0.5
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

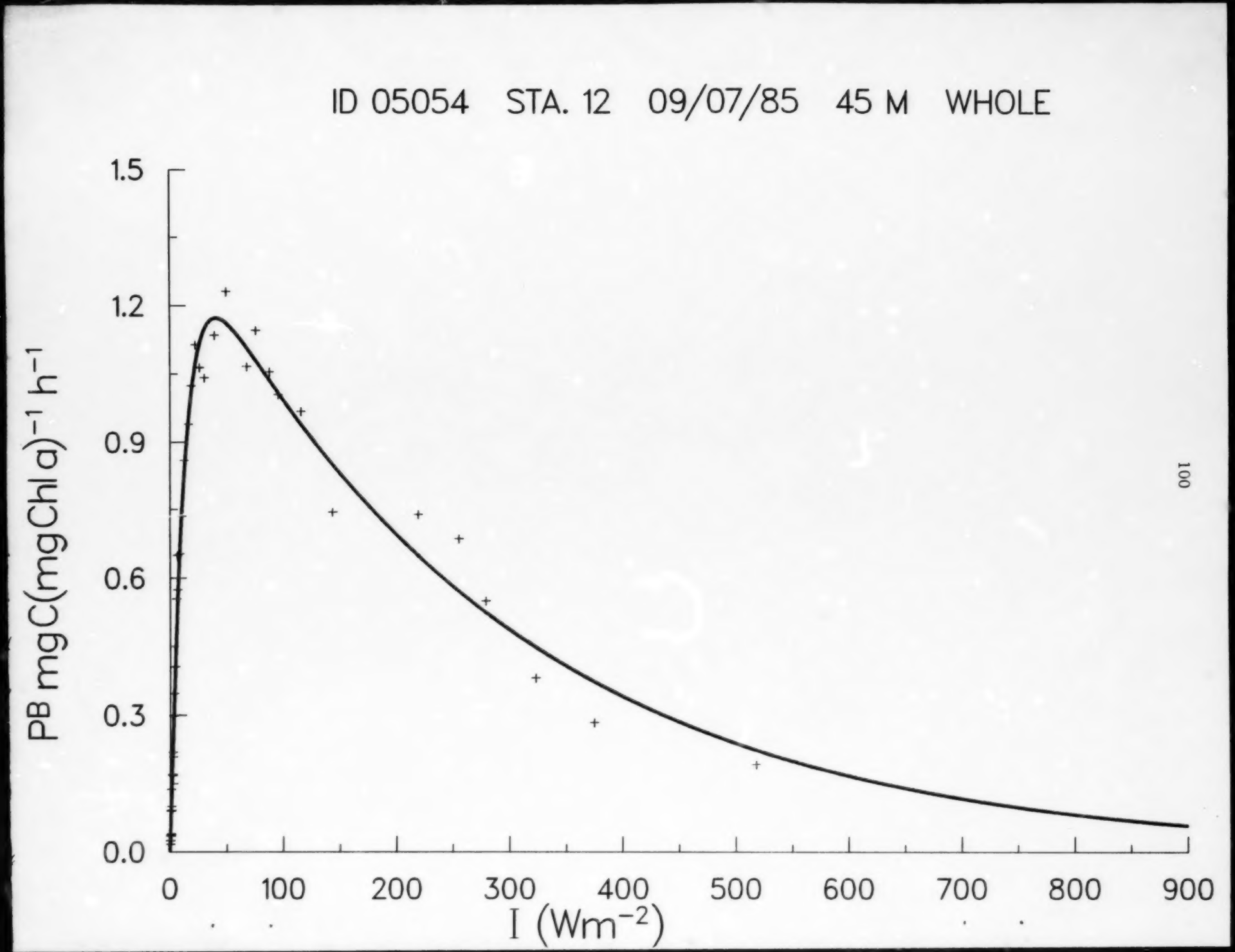

ID 05046 STA. 10 08/07/85 30 M WHOLE
5.0
4.0
3.0
2.0
1.0
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

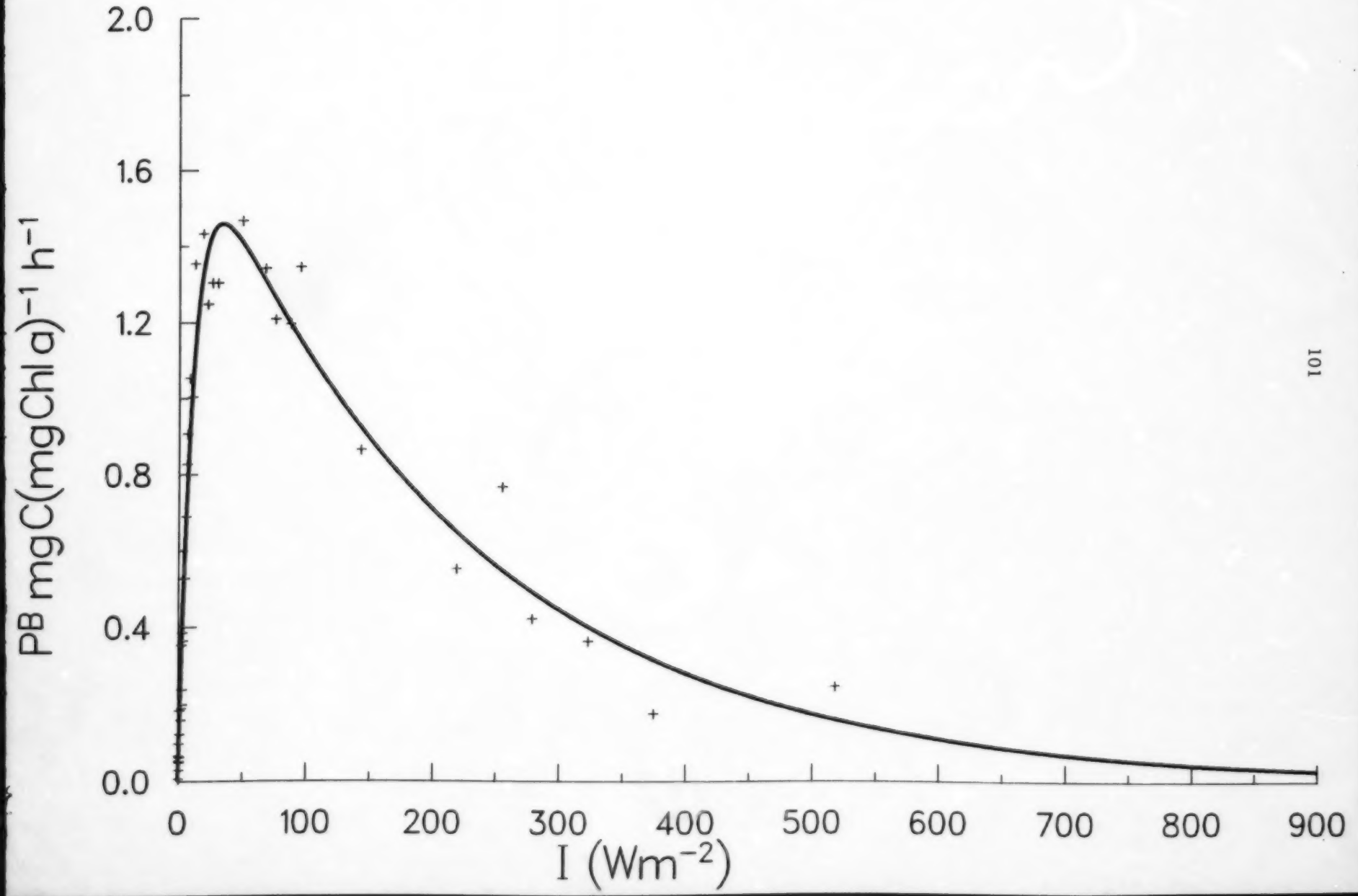

ID 05048 STA. 11 09/07/85 1 M WHOLE
1.5
1.2
0.9
0.6
0.3
0.0
PB mgC(mgChl a)⁻¹ h⁻¹
0
100
200
300
400
500
600
700
800
900
I (Wm⁻²)
96

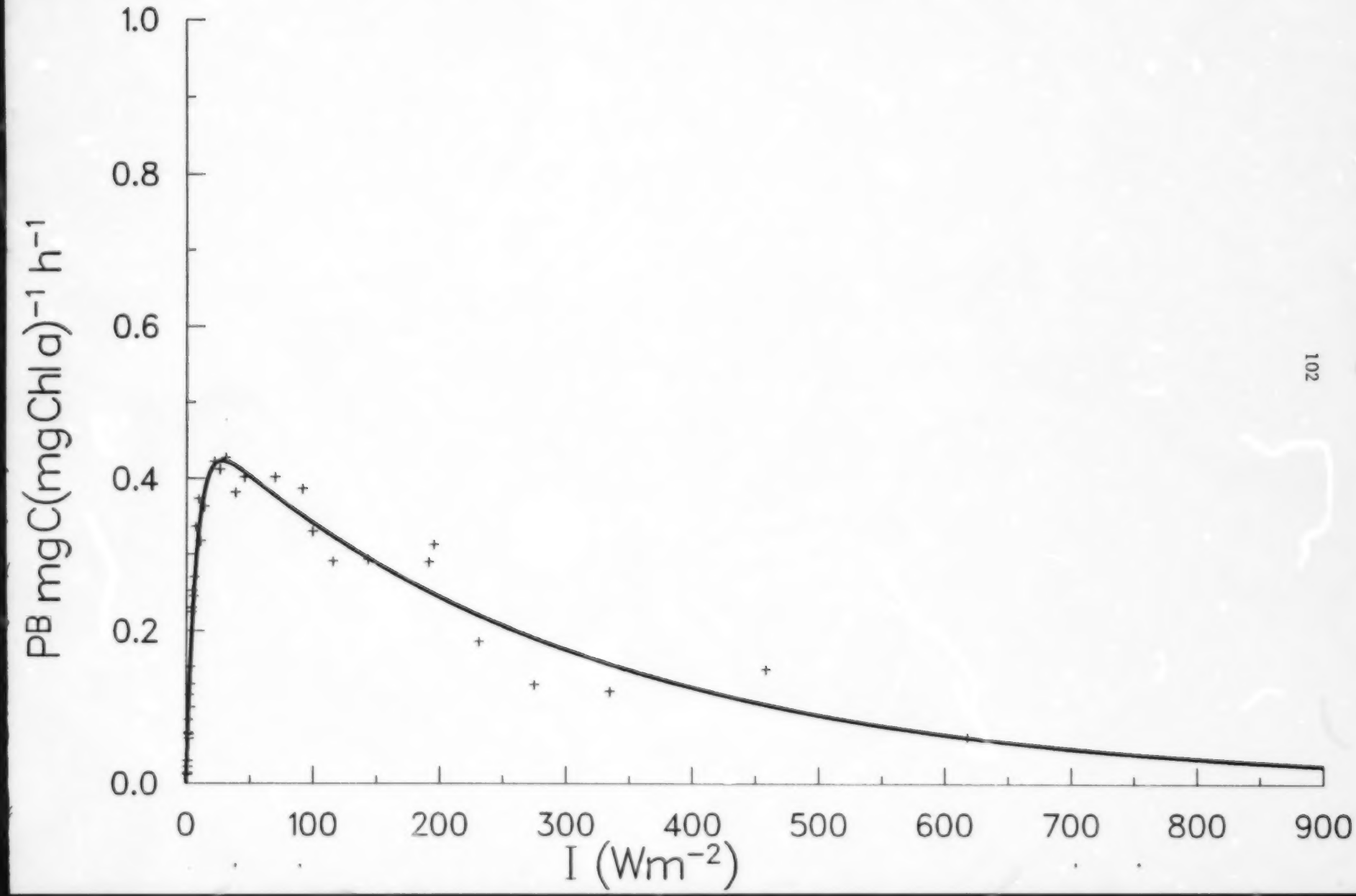

ID 05049 STA. 11 09/07/85 10 M WHOLE
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

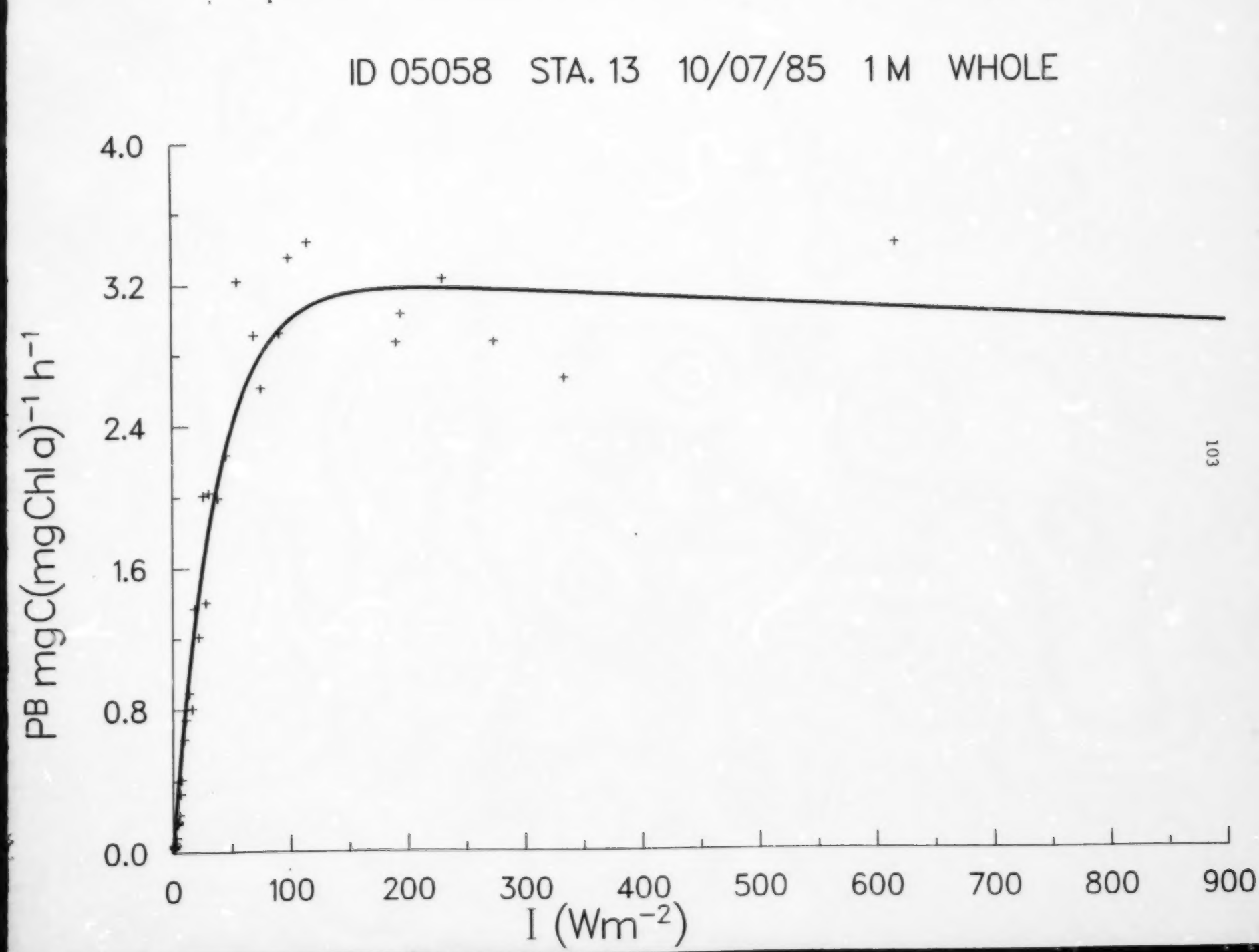

ID 05050 STA. 11 09/07/85 30 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
86

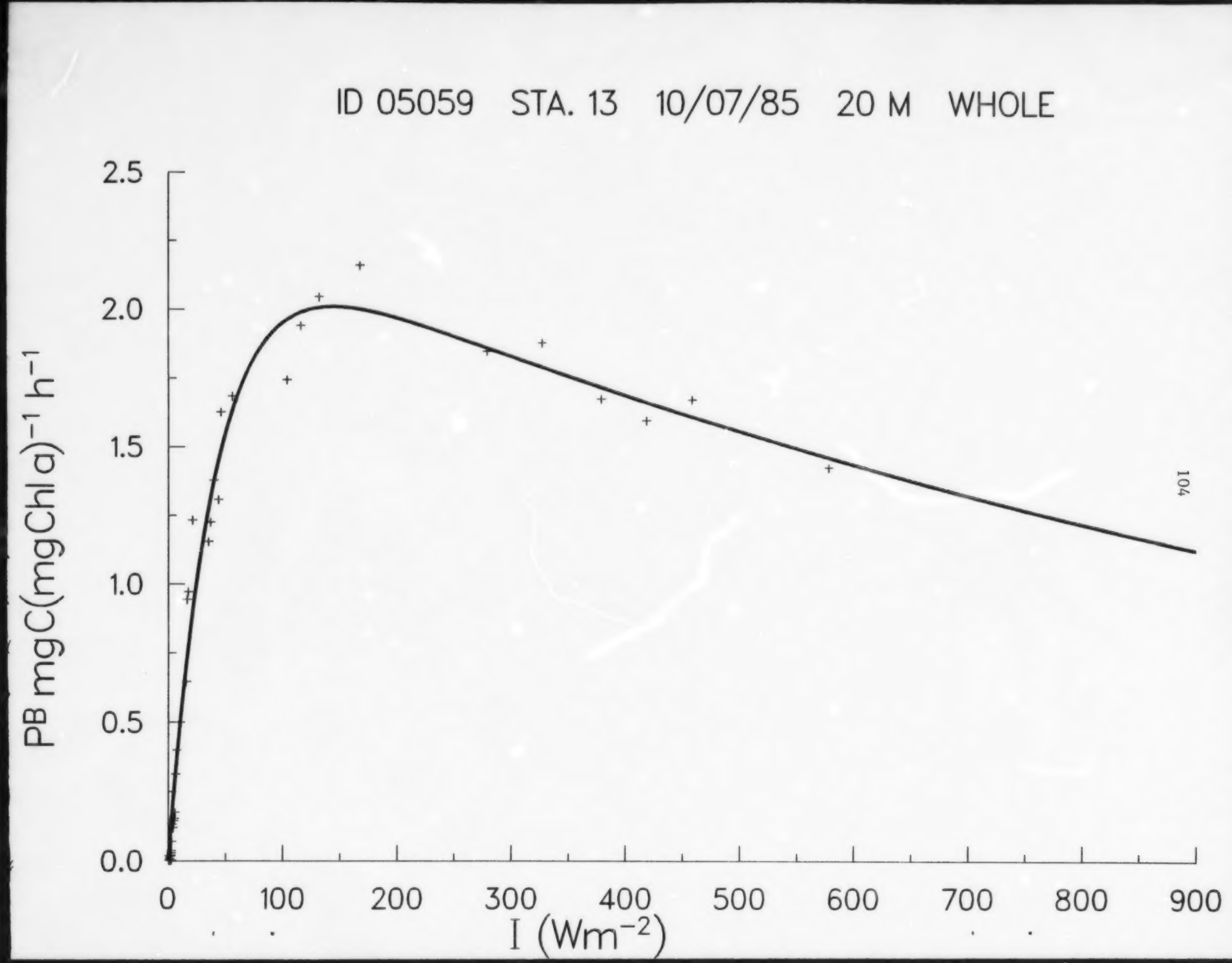

ID 05051 STA. 11 09/07/85 50 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
99

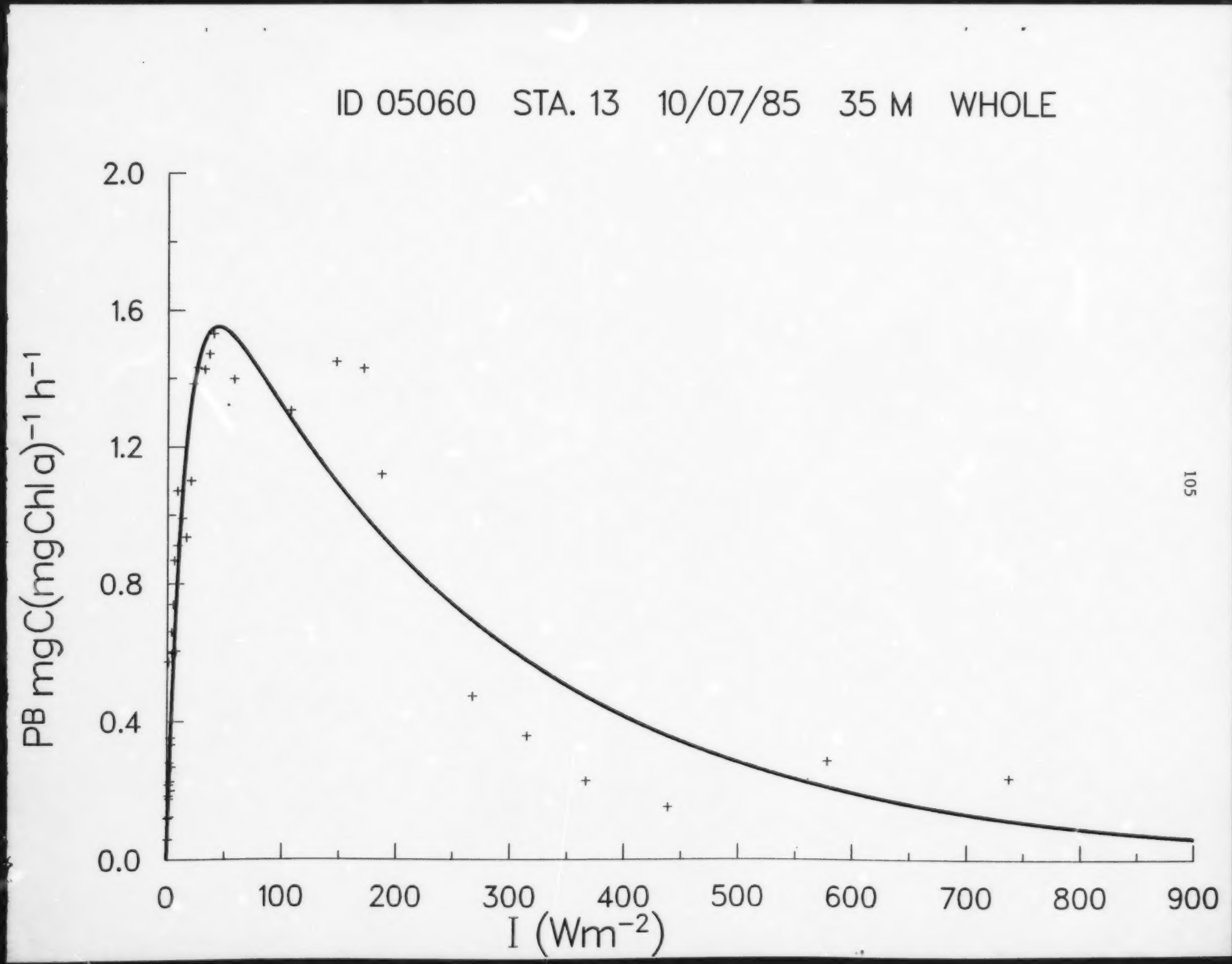

ID 05054 STA. 12 09/07/85 45 M WHOLE
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.5
1.2
0.9
0.6
0.3
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
100

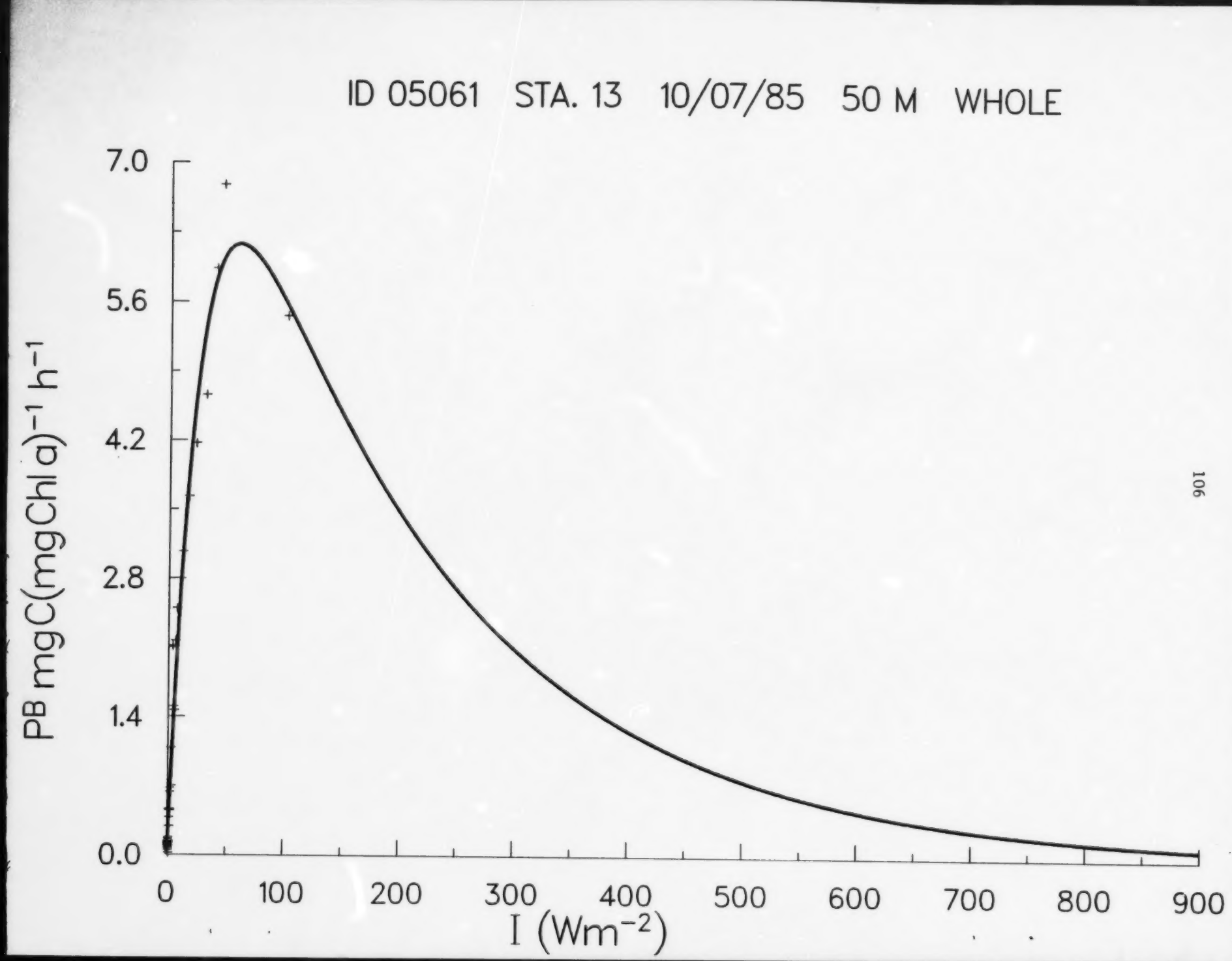

ID 05055 STA. 12 09/07/85 45 M > 1 MIC
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
2.0
1.6
1.2
0.8
0.4
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

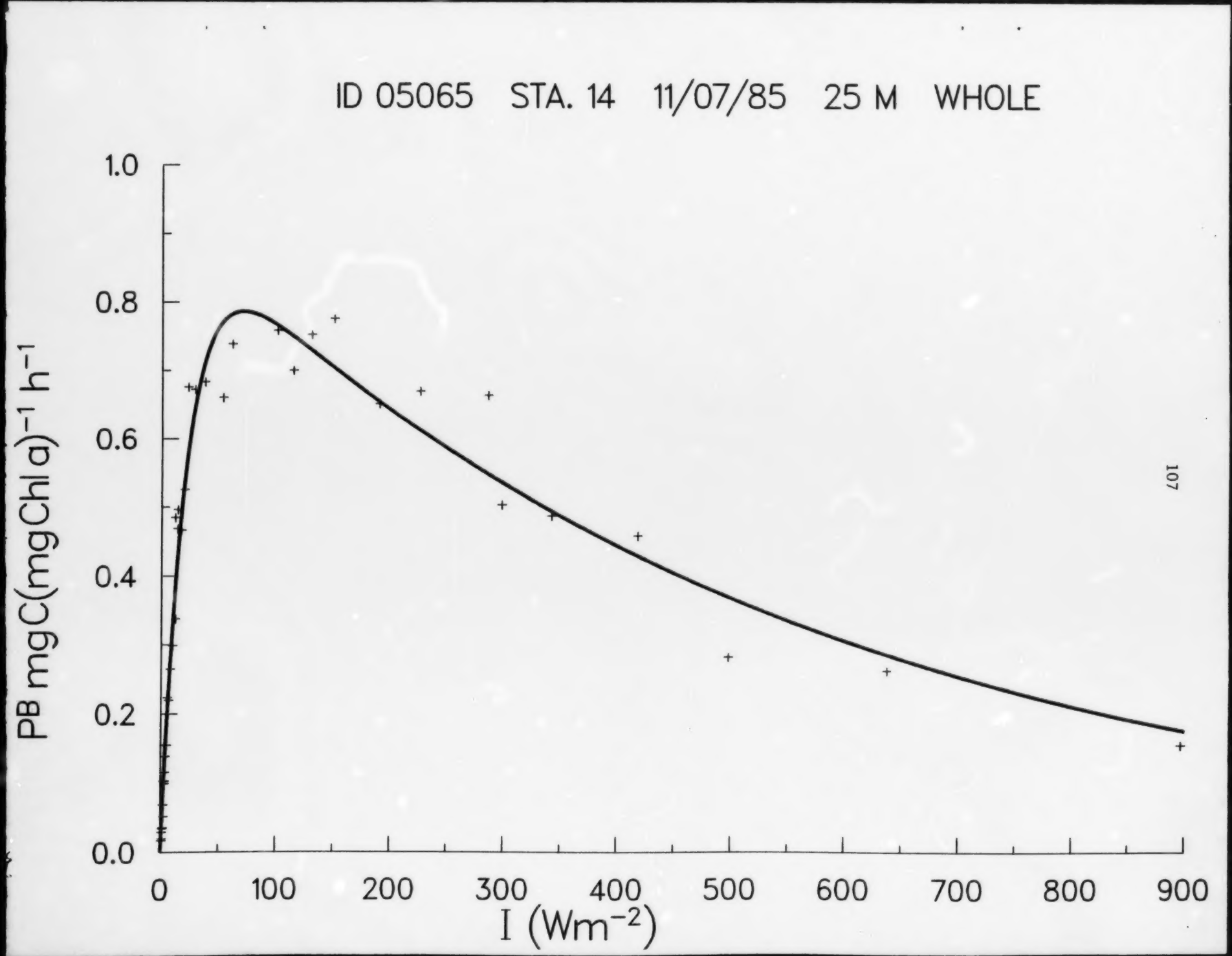

ID 05056 STA. 12 09/07/85 45 M < 1 MIC
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

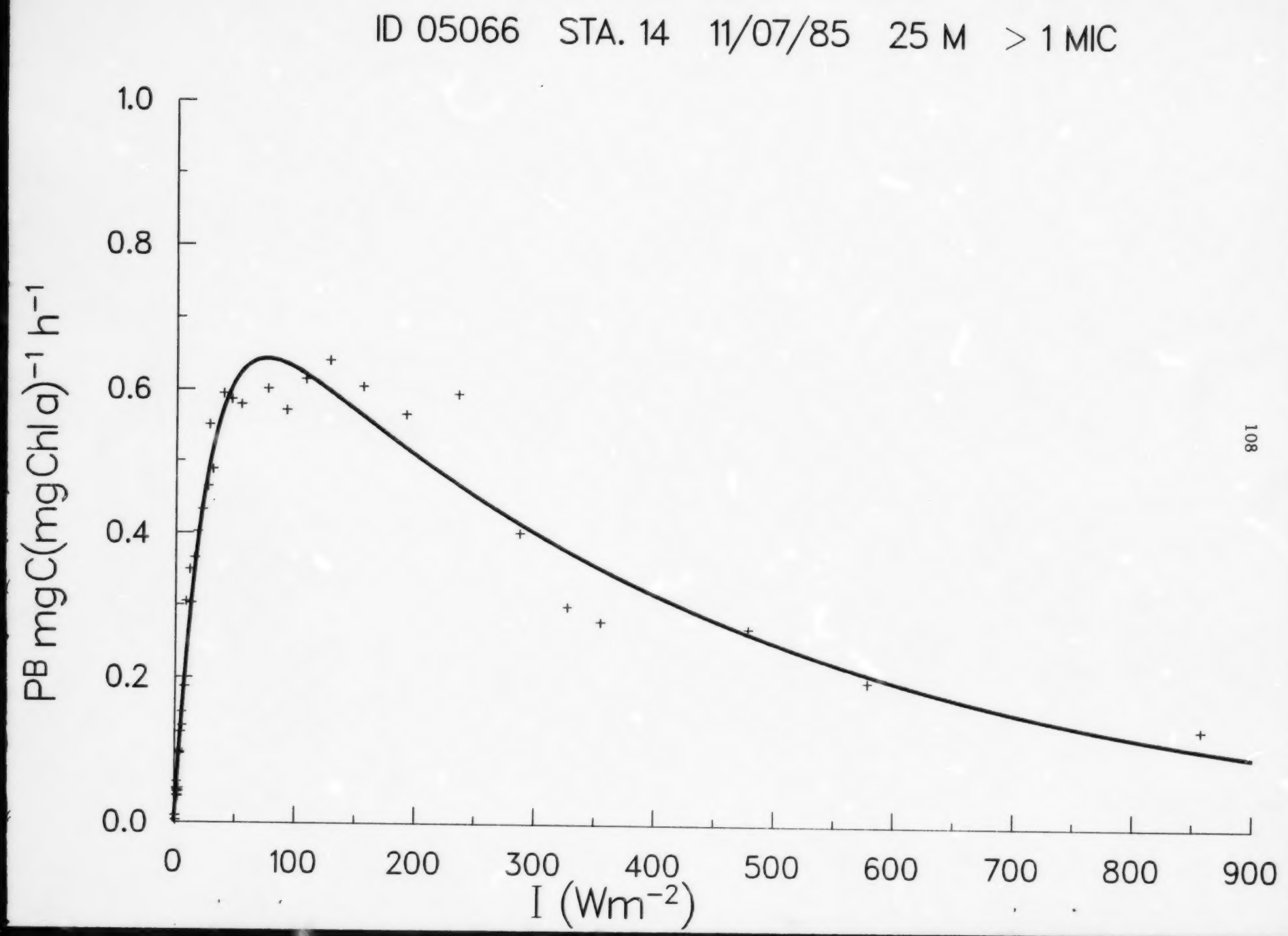

ID 05058 STA. 13 10/07/85 1 M WHOLE
4.0
3.2
2.4
1.6
0.8
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)

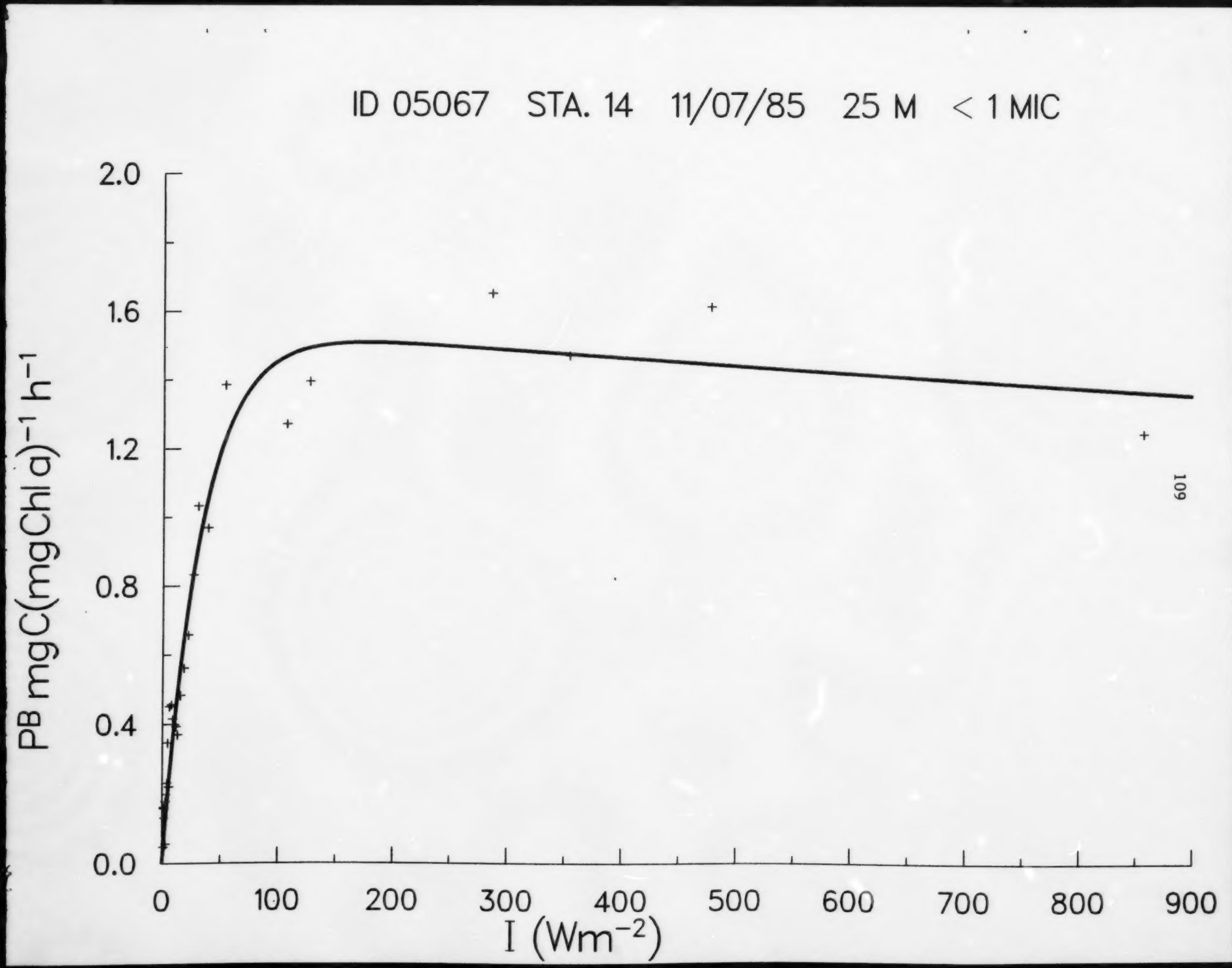

ID 05059 STA. 13 10/07/85 20 M WHOLE
2.5
2.0
1.5
1.0
0.5
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
104

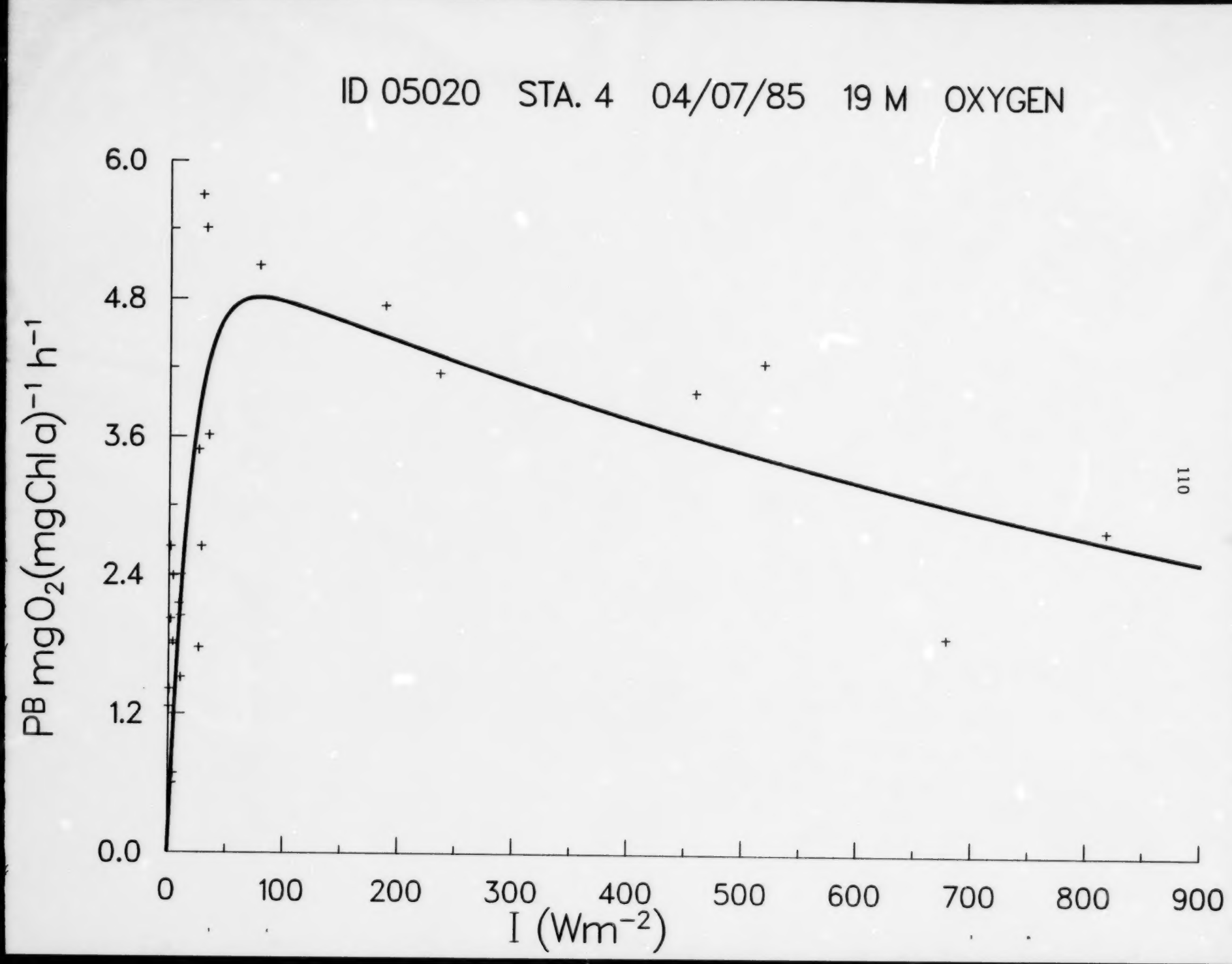

ID 05060 STA. 13 10/07/85 35 M WHOLE
2.0
1.6
1.2
0.8
0.4
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
105

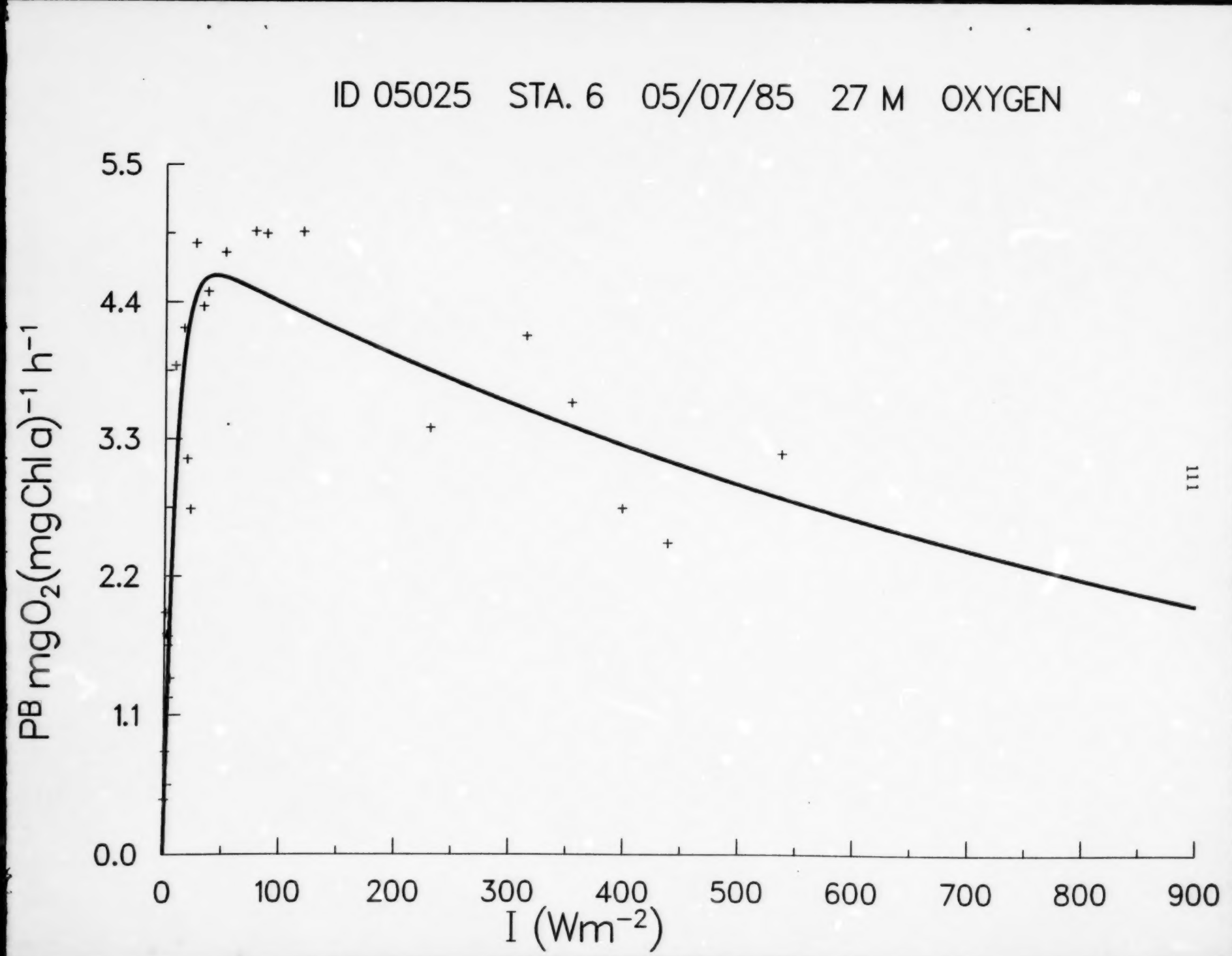

ID 05061 STA. 13 10/07/85 50 M WHOLE
7.0
5.6
4.2
2.8
1.4
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
106

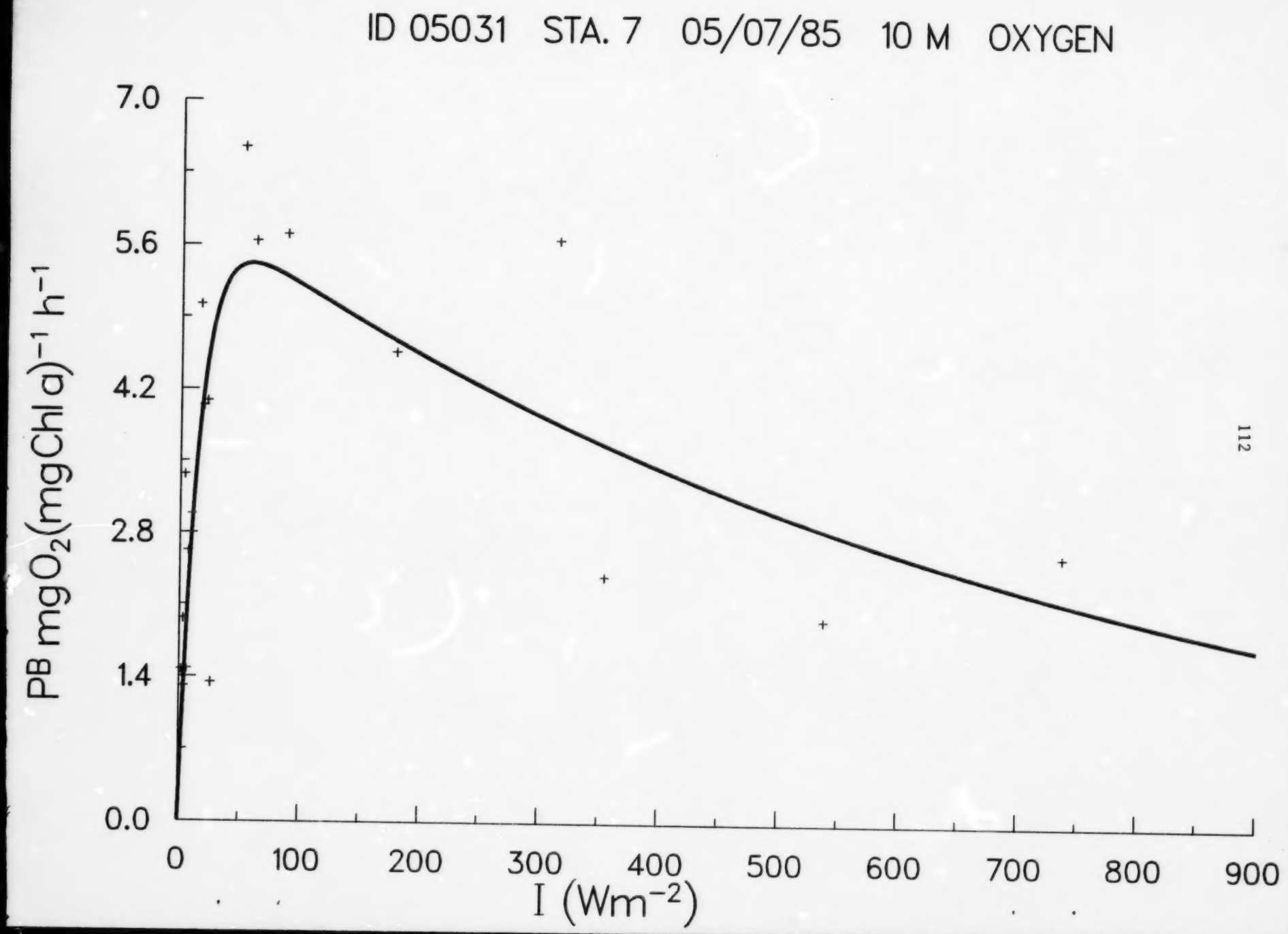

ID 05065 STA. 14 11/07/85 25 M WHOLE
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
107


ID 05066 STA. 14 11/07/85 25 M > 1 MIC
1.0
0.8
0.6
0.4
0.2
0.0
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
108


ID 05067 STA. 14 11/07/85 25 M < 1 MIC
PB mgC(mgChl a)$^{-1}$ h$^{-1}$
2.0
1.6
1.2
0.8
0.4
0.0
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
109


ID 05020 STA. 4 04/07/85 19 M OXYGEN
6.0
4.8
3.6
2.4
1.2
0.0
$P^B$ mg$O_2$(mgChl a)$^{-1}$ h$^{-1}$
0
100
200
300
400
500
600
700
800
900
I (Wm$^{-2}$)
110


ID 05025 STA. 6 05/07/85 27 M OXYGEN
5.5
4.4
3.3
2.2
1.1
0.0
PB mgO2(mgChl a)-1 h-1
0
100
200
300
400
500
600
700
800
900
I (Wm-2)


ID 05031 STA. 7 05/07/85 10 M OXYGEN
7.0
5.6
4.2
2.8
1.4
0.0
PB mgO2(mgChl a)-1 h-1
0
100
200
300
400
500
600
700
800
900
I (Wm-2)
112

# TOTAL RADIATION

Totals are W $m^{-2}$ for each hour ending at hour indicated. All times are ADT.

LABRADOR SEA

JULY 1985

TOTAL RADIATION

| TIME | 02/07 | 03/07 | 04/07 | 05/07 | 06/07 | 07/07 | 08/07 | 09/07 | 10/07 | 11/07 | 12/07 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0500 | 7 | 23 | 11 | 0 | 12 | 7 | 12 | - | 7 | 12 | 0 |
| 0600 | 21 | 70 | 48 | 9 | 45 | 27 | 41 | - | 34 | 44 | 13 |
| 0700 | 60 | 200 | 77 | 14 | 94 | 122 | 85 | - | 96 | 131 | 72 |
| 0800 | 81 | 87 | 123 | 13 | 194 | 119 | 94 | - | 207 | 246 | 111 |
| 0900 | 105 | 53 | 141 | 54 | 320 | 269 | 44 | 96 | 234 | 170 | 229 |
| 1000 | 130 | 326 | 245 | 131 | 337 | 241 | 45 | 232 | 269 | 366 | 395 |
| 1100 | 300 | 539 | 465 | 241 | 419 | 231 | 73 | 166 | 385 | 524 | 457 |
| 1200 | 409 | 593 | 537 | 350 | 491 | 363 | 124 | 385 | 383 | 562 | 425 |
| 1300 | 657 | 598 | 525 | 368 | 390 | 539 | 118 | 451 | 369 | 494 | 591 |
| 1400 | 626 | 569 | 512 | 385 | 99 | 617 | 93 | 449 | 516 | 490 | 556 |
| 1500 | 577 | 543 | 461 | 551 | 106 | 638 | 68 | 400 | 490 | 415 | 557 |
| 1600 | 474 | 449 | 450 | 484 | 56 | 525 | 54 | 288 | 492 | 291 | 172 |
| 1700 | 371 | 426 | 285 | 471 | 63 | 398 | - | 192 | 121 | 168 | 445 |
| 1800 | 244 | 245 | 122 | 354 | 87 | 224 | - | 77 | 57 | 51 | 366 |
| 1900 | 90 | 61 | 65 | 197 | 85 | 173 | - | 27 | 47 | 21 | 314 |
| 2000 | 27 | 47 | 38 | 128 | 106 | 174 | - | 15 | 29 | 16 | 44 |
| 2100 | 9 | 11 | 8 | 20 | 44 | 57 | - | 1 | 6 | 3 | 4 |
| 2200 | 0 | 0 | 0 | 0 | 2 | 2 | - | 0 | 0 | 0 | 0 |

# PHOTOSYNTHETICALLY ACTIVE RADIATION

## PAR

Totals are W $m^{-2}$ for each hour ending at hour indicated. All times are ADT.

LABRADOR SEA

JULY 1985

PAR

| TIME | 02/07 | 03/07 | 04/07 | 05/07 | 06/07 | 07/07 | 08/07 | 09/07 | 10/07 | 11/07 | 12/07 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0500 | 6 | 17 | 9 | 1 | 7 | 5 | 7 | 3 | 7 | 6 | 0 |
| 0600 | 18 | 54 | 38 | 8 | 33 | 21 | 32 | 22 | 29 | 33 | 12 |
| 0700 | 51 | 147 | 64 | 14 | 71 | 74 | 70 | 37 | 79 | 98 | 57 |
| 0800 | 70 | 71 | 100 | 14 | 153 | 90 | 82 | 59 | 169 | 184 | 92 |
| 0900 | 92 | 53 | 119 | 51 | 255 | 207 | 43 | 83 | 193 | 146 | 182 |
| 1000 | 114 | 292 | 204 | 119 | 279 | 186 | 46 | 197 | 220 | 307 | 308 |
| 1100 | 250 | 493 | 390 | 202 | 360 | 193 | 72 | 147 | 318 | 429 | 371 |
| 1200 | 342 | 567 | 462 | 290 | 410 | 305 | 117 | 331 | 330 | 471 | 352 |
| 1300 | 524 | 516 | 467 | 302 | 328 | 437 | 110 | 396 | 317 | 425 | 510 |
| 1400 | 497 | 452 | 434 | 317 | 92 | 478 | 90 | 403 | 472 | 415 | 489 |
| 1500 | 420 | 441 | 391 | 418 | 98 | 513 | 69 | 361 | 446 | 348 | 481 |
| 1600 | 366 | 343 | 361 | 363 | 54 | 440 | 55 | 249 | 375 | 243 | 190 |
| 1700 | 295 | 313 | 221 | 327 | 61 | 314 | 53 | 167 | 101 | 149 | 364 |
| 1800 | 191 | 180 | 106 | 240 | 77 | 179 | 43 | 70 | 59 | 49 | 275 |
| 1900 | 75 | 58 | 59 | 132 | 72 | 109 | 41 | 25 | 50 | 22 | 232 |
| 2000 | 27 | 38 | 31 | 56 | 73 | 125 | 24 | 14 | 29 | 16 | 39 |
| 2100 | 8 | 9 | 7 | 12 | 25 | 39 | 6 | 2 | 6 | 3 | 4 |
| 2200 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |